

# COMPUTERWORLD

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## Cincom paves DDP pathway for users of IBM machines

By John Gallant  
CW Staff

NEW YORK — Paving the way for a distributed data processing environment, Cincom Systems, Inc. last week introduced a network management system that the company said will integrate a multi-CPU, multiapplication IBM computer network into a single operating unit.

Unveiled at a press conference here, Cincom's Net/Master networking software came as no surprise to industry watchers [CW, Feb. 6]. The company's extensive research and development efforts during the past few years have resulted in a number of major product announcements, including the debut in January of PC Contact, a microcomputer-to-mainframe link; the Manage User series of mainframe decision support tools; and Cricket, an IBM Personal Computer XT/370 version of Cincom's Mantis application development system.

Cincom was an early proponent of the distributed data base concept, and Net/Master — especially a briefly hinted at, but as yet unavailable, fourth component of that system — is a major step toward providing full distributed processing capabilities, the company said. Cincom acquired the worldwide marketing rights for Net/Master from Software Development Pty., Ltd. of Sydney, Australia.

Net/Master operates under IBM's MVS and VS/1 operating systems and allows an organization to utilize IBM's Vtm networking environment fully, a Cincom spokesman said. With Net/Master, users of Cincom's TIS data base management system can integrate multiple TIS installations on different CPUs and operating systems and link diverse teleprocessing applications.

The software reportedly can integrate  
See CINCOM page 4

## A CLOSER LOOK

## Micros breathing new life into DDP

By Eric Bender  
and Tom Henkel  
CW Staff

When the superminicomputer burst onto the DP scene in the late 1970s, industry pundits proclaimed the birth of a new concept in computing. In the future, they said, companies would scrap



their massive central DP facilities in favor of smaller, regional superminis.

This concept of distributed data processing had merits. For example, a company could

reduce its networking costs by using interactive remote processors linked, in a batch mode, to one central host mainframe. And the company could provide faster response time and boost flexibility, as well as prevent all corporate computer operations from coming to a grinding halt in the event of a system failure or disaster in the central computer room.

But there could also be problems with the concept. While superminis cost less than mainframes, their use in remote locations generally requires separate DP staffs, noted Frank Gens, an analyst with the Yankee Group consulting firm in Boston. As a result, DDP based on superminicomputers often proved expensive.

Now, with the explosion of microcomputers, the concept of DDP is making a comeback. Microcomputers recently introduced by AT&T, Digital Equipment Corp. and IBM, among others, appear suited for applications similar to those targeted by the supermini vendors about five years ago (see stories on pages 6 and 7). But they are much less expensive than superminis and, generally, do not require highly trained personnel to run them.

"The first steps have been taken to start — and I emphasize *start* — solving the problems of distributed computing," said Jack Scanlon, vice-president of AT&T's Computer Systems Division. "Everyone's moving to glue his desktop into the mainframe. Nobody has the total solution. You have to make compatible systems out of incompatible parts."

Current DDP implementations are just beginning to fill in the gaps. Often, firms make the initial connection between mid-level machines, then establish links to low-end machines (personal computers) and, finally, make mainframe links.

Compared with traditional time-sharing, micro-based DDP offers users flexible processing and data storage strategies, adherents said. Another plus is modular expansion, said Nathan Kalowski, product group manager for the DEC Professional series. As one example,

See DDP page 6

## Ashton-Tate unwraps Dbase III, relational DBMS for IBM micros

By Eric Bender  
CW Staff

NEW YORK — The "next-generation" version of Dbase II, the world's most widely installed microcomputer data base management system, was announced here last week by Ashton-Tate. Dbase III runs under the IBM PC-DOS operating system on IBM and compatible microcomputers.

Dbase III offers faster performance, more commands and easier to use features than Dbase II, Ashton-Tate said. The relational DBMS version can store over two billion records per data base (limited by a system's hardware constraints) and 128 fields per record; it provides the ability to access 10 data bases simultaneously, ac-

cording to Ashton-Tate.

Among other enhancements, Dbase III handles two new field types: a date field, allowing numeric calculations with dates; and a memo field, permitting entry of up to 4,000 bytes of text, Ashton-Tate said.

New ease-of-use features include Dbase Assistant, a command assistance mode with prompts and menus to guide new users through the most common areas of data base use. Dbase III also features a menu-driven setup for defining function keys and color displays.

In addition, the package reportedly gives on-line Help, full screen entry and modification and generation of reports and

See DBASE page 16

## TOP OF THE NEWS

If all goes according to schedule, AT&T will cut your communications bill an average of 6.1% on Friday. **Page 2.**

The clouds dispersed and the sky became bluer last week for users of IBM's older 3080 processors. The company announced a \$16,000 option to boost those machines' performance. **Page 4.**

A little short of cash this week? NEC Information Systems, Inc. became the first major microcomputer vendor to offer business users a complete 16-bit personal computer for less than \$2,000. It will be on display tomorrow, when Comdex/Spring '84 opens in Atlanta. **Page 8.**

Picture this: Single-user, 32-bit workstations dominating show product announcements. That was the scene at the National Computer Graphics Association's fifth annual conference, held last

week in Anaheim, Calif. **Page 13.**

Step right up, the Hartford Insurance Group's nearly 2,000 DP workers were told. Members of the Systems Productivity Support Division held a fair — complete with balloons and free T-shirts — to demonstrate the tools the group promotes for enhancing DP productivity. **Page 17.**

Looking for hardware? Gould, Inc. announced a virtual-memory, Unix-based addition to its Powerseries family of distributed systems, and Nohalt Computers brought out a 16-bit version of its Reliant fault-tolerant system. **Page 59.**

Two major trade groups have joined the battle over whether software suppliers should pay sales taxes in California. **Page 101.**



## NEWS

# Reductions in AT&T rates slated to take effect Friday

By Phil Hirsch  
CW Washington Bureau

WASHINGTON, D.C. — After months of haggling, all signs last week pointed toward an average 6.1% rate reduction for users of AT&T's domestic and international switched telephone services. The reductions are slated to take effect Friday, May 25.

AT&T's two chief rivals, GTE Sprint Communications Co. and MCI Communications Corp., said last week they have no immediate plans for reductions. However, each company had previously lowered its rates.

The latest act in the rate drama occurred May 10, when the Federal Communications Commission ordered the divested Bell operating companies to lop \$700 million off their charges to AT&T for local access [CW, May 14]. That reduction, along with others mandated by the commission, is the basis for requiring a 6.1% across-the-board decrease in AT&T's usage rates for domestic and international Message Toll Service and for Wats.

## Effective May 25

The commission said that if the divested operating companies and AT&T filed tariffs by May 18, implementing the reductions, the new rates could become effective on May 25. At press time last week, a company official preparing AT&T's revised tariffs said he expected to meet the deadline. Wendell Lind, division manager for network rates, also said that the actual reductions will range from 4.6% to 7.1%.

The carrier common-line charges to be paid by AT&T and other interstate carriers are specified in a tariff to be filed by the National Exchange Carriers Association (Neca), an association of local telephone companies. All of these companies will specify their own carrier common-line charges by referring to the Neca tariff.

Gordon R. Evans, Neca's director of tariff and regulatory matters, told *Computerworld* last week that he expected the association would be able to file its revised carrier common-line tariff by May 18.

## Revised tariffs

Spokesmen for four of the seven regional holding companies — Bell Atlantic, Ameritech, Nynex and U.S. West — also reported that their organizations intend to file revised tariffs by May 18. An informed source said that all seven intended to meet the commission's deadline.

The tariffs are particularly significant because they will specify the local-access surcharges that customers with multiple lines into local telephone exchange networks must begin paying once the 6.1% reduction in AT&T's long-distance rates takes effect.

The surcharge applies to all multiline users, regardless of whether they make interstate calls.

The FCC has set a monthly cap of \$6 per line, except for access lines connected to Centrex systems that were installed or on order as of June 27, 1983. The monthly charge for those customers is capped at \$2 a line.

# Private-line backlog rises Expect service delay to continue: AT&T

WASHINGTON, D.C. — Delays in processing customer orders for private-line service will continue for several months, AT&T Communications Vice-President John Blanchard said here last week.

A new procedure must be developed for placing orders with the divested Bell operating companies, Blanchard explained, adding that it will be mid-1985 before this procedure is operational.

However, the delays in private-line order processing may be reduced before then, he said, because the staff assigned to this job is being increased from 2,600 to 4,700 people. The backlog — which now totals 28,200 separate service requests —

is nearly three times what it was last January.

However, AT&T has pared its backlog of orders for Wats service from 16,400 in March to 13,900; it expects to be caught up by Labor Day, according to the AT&T vice-president.

During the past three months, the Federal Communications Commission has received 700 complaints about AT&T's inability to service its private-line and Wats customers promptly.

Most of those complaints have come from business firms. The commission has threatened to take action if the situation does not improve quickly.

## NEWS SUMMARY

Three months after replacing its 3080 series of mainframes with faster X model processors, Big Blue announced an optional performance enhancement designed to improve the older systems/4

NEC Information Systems, Inc. last week introduced a 16-bit business microcomputer for less than \$2,000 and endorsed Unix/8

Comdex/Spring '84, the large show for small computers, is expected to draw many corporate microcomputer managers when it opens its doors tomorrow in Atlanta/8

**PRODUCT SPOTLIGHT:** A look at supermicros/10

Single-user, 32-bit workstations accounted for a high percentage of the new product announcements unveiled last week at the National Computer Graphics Association's fifth annual conference/13

**CW at NOAC:** Prepare for the worst, advises the former official of a Minnesota bank that is fighting back from a devastating fire that destroyed its main offices. . . . The president-elect of the American Bankers Association calls on the U.S. Congress to help banks compete with nonbanks that offer computer-based services and to let the banks charge customers for the expanding list of those banking services. . . . Computer operations managers will be the coordinators responsible for providing critical services as the banking industry moves into a new era of automation and diversification, says the conference's keynote speaker/14-15

Four individuals were arraigned on charges that they illegally accessed GTE Telenet Communications Corp.'s Telemail system and penetrated the accounts of major U.S. corporations as well as the U.S. government. Meanwhile, GTE Telenet introduced encryption software designed to protect Telemail users/16

The Hartford Insurance Group this

month held its first programmer productivity fair, complete with balloons and free T-shirts/17

**CW at MPG Roundtable:** A user of Ramis II says fourth-generation languages can now satisfy most requirements of large programming installations. . . . An early user of Mathematics Products Group, Inc.'s English natural query language recently said the product has the potential to open up the corporate data base to a new breed of end user. . . . Information centers are here to stay, and DP departments should prepare for the consequences, both good and bad, warns a consultant/18-19

Lawyers are increasingly turning to personal computers for word processing, on-line legal research and electronic mail, among other services. Do they leave themselves open to file tampering — and lawsuits — when they convert to on-line storage of their client files?/23

A congressional study released recently predicted little near-term employment effects from computerized manufacturing automation/24

While the Federal Computer Systems Protection Act languishes in subcommittee, a similar bill under another name is moving quietly but quickly through the U.S. Congress/29

Duplicate food stamp benefits were issued when the Georgia Department of Resources automated its public assistance program/29

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## IN DEPTH

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# ICA lawyer expects more cuts in AT&T's MTS, Wats rates

WASHINGTON, D.C. — AT&T customers can expect further reductions in Message Toll Service (MTS) and Wats rates, according to Dan Harrold, an attorney for the International Communications Association (ICA), a users' group representing several of the nation's Fortune 500 companies. Harrold was interviewed after the Federal Communications Commission's May 10 order cutting AT&T's MTS/Wats charges an average of 6.1% [CW, May 14].

The new rates embody the FCC's much-debated access-charge plan. As originally drafted, the plan called for imposing surcharges on residential as well as business users of local-exchange networks and reducing the fees for long-distance users accordingly.

Because of congressional opposition, however, the FCC deferred surcharges for residential and single-line business users until next year. If those charges are imposed, according to Harrold, AT&T will be ordered to make a further reduction in its MTS/Wats rates beyond the 6.1% ordered by the commission May 10.

Since the surcharge has not been

waived for multiline business customers, however, their savings will be less than 6.1%. Neither Harrold nor attorney James Blazak, who represents another business communications user group — the Ad Hoc Telecommunications Users Committee — was able to estimate what the benefit would be for these users.

The biggest single reason for the 6.1% rate reduction was the FCC's finding that the divested Bell operating companies had greatly overstated the carrier common line "revenue requirement," the amount that AT&T and the other interstate carriers must pay local carriers for providing local-access facilities.

There is a possibility, Harrold said, that the FCC will take similar action when it considers the operating companies' pending "special access" tariffs and the related AT&T proposals for inter-Local Access and Transport Area private-line services.

Many of the costs assigned to the special access facilities are based on the same assumptions used in costing the carrier common line facilities.

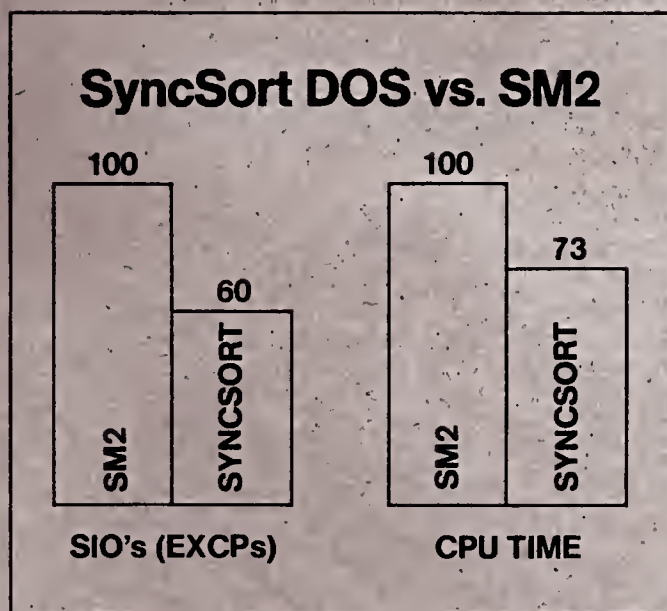


# IN-LAWS

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**—Old Chinese Proverb.**

\* \* \*

You say you just got this brand-new 4300? It's got big blue eyes, great price-performance curves and nifty disk drives? Now you're thinking about marrying it to IBM's 5746-SM2 sort program?

Well, don't do it pardner! The groom is definitely too old for the bride. Like IBM's other DOS sorts, SM2 is a hangover from an older generation of sorting technology.

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**2. BETTER PROGRAMMER PRODUCTIVITY.** SyncSort DOS has a host of features to cut the amount of programming time that goes into applications. You can often reduce the amount of time required for simple reports from five programmer days to one programmer day simply by using these features. They can:

- select relevant records;
- perform summaries on designated numeric fields;
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- convert numeric data to printable characters (including editing);
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## NEWS

# IBM announces option to boost 3080 performance

By Tom Henkel  
CW Staff

RYE BROOK, N.Y. — Three months after replacing the six basic models of its 3080 series of mainframes with faster models, IBM last week offered users of the older, non-X model mainframes an optional performance enhancement said to boost internal throughput by roughly 6%. The announcement means some users of those older machines may not have to upgrade to the X series.

The option consists of a series of processor cards and cabling enhancements said to lower the machine cycle time on non-X 3080 processors from 26 to 24.5 nsec. Costing \$16,000, the option will be available in September.

The option takes approximately 18 hours to install, IBM said. Much of that time is devoted to testing, according to a spokesman, but systems must be out of service for the entire

18-hour period.

Users of the dual-processor 3084 can use a system partition mode to keep one processor running while the other undergoes the 18-hour modifications. However, when both 3084 processors are enhanced, the spokesman said, the 3084 processor complex must be shut down for 2.6 hours of additional testing.

The performance option consists of two parts. An \$11,000 enhancement, called Feature 4010, is incorporated into the 3081 Model G and K processors, the 3083 Models E, B and J and the 3084 Model Q. (The spokesman noted that the 3084 requires two enhancements, one for each of the dual CPUs in the 3084 processor complex. For those users, a second \$11,000 enhancement, called Feature 4011, is available.)

The second part of the enhancement is the Feature 4020, a \$5,000 series of additions made to the IBM

3082 system controller. For 3084 users, a second \$5,000 enhancement, Feature 4021, is available.

The 4010 and 4011 features are available on a 48-month lease plan for \$733/mo. The 4021 and 4020 features are available on the same plan for \$333/mo. That means performance enhancement can be leased for \$1,066/mo (\$2,132/mo for the 3084).

Rental plans are also available. Term leases and installation payment financing is available through the IBM Credit Corp.

The performance enhancement appears to be an attempt by IBM to satisfy users of its older 3080 mainframes. In February, the company announced six additions to its 3080 processor lineup that employ a newer circuit packing technology and offer up to 14% more performance than the older models [CW, Feb. 27]. At the same time, IBM announced it would stop selling the non-X 3080

models to new customers and said that customers with 3080 series systems on order would automatically receive the comparable X model processor.

While the X model processors cost the same and are software-compatible with the non-X models, current users cannot field-upgrade to the newer systems.

In February, IBM cut the model-to-model upgrade prices on non-X models by as much as 10% and lowered the monthly maintenance charges by as much as 15%. That move appeared to be an appeasement to users of the older processors.

Now, noted Steve Josselyn, an analyst with International Data Corp. in Framingham, Mass., IBM appears to have offered another appeasement to users of the non-X models — the ability to make a reasonably inexpensive, short-term performance upgrade.

## CINCOM from page 1

IBM's IMS, TSO, CICS and Cincom's TIS-Data Communications (TIS-DC) and its Environ/1 teleprocessing monitor into one network.

The three initial components of Net/Master that are currently available include Advanced Network Management; Network Integration; and Distributed Processing and Data Management Support.

The fourth module — Intersystems Communications — is currently in beta site testing and is scheduled for shipment within three months, the vendor said.

The Advanced Network Management component is said to give an operations staff a set of tools with which to manage a network of multiple terminals off a single CPU or a network of multiple CPUs. Among

those tools are:

- A Multiple Application Interface that enables any terminal in the network to access IMS, TSO, CICS, TIS-DC and Environ/1 simultaneously. Programmers can initiate multiple TSO sessions from a single terminal at one time.

- Operator Control Services, which enable users to manage either a single CPU or a multi-CPU network. The spokesman said that centralized routing of Vtam messages enables the network to be controlled from a single terminal. The system utilizes abbreviated Vtam commands and function keys, and split-screen operation allows the network operator to conduct multiple sessions. Through this facility, a network operator reportedly can optimize available bandwidth between CPUs.

- A Network Control Language,

which is said to be a high-level interpretive language that gives users the ability to create precoded network command sequences to automate network operations and handle network failures.

The Advanced Network Management component also provides facilities for error checking, performance and activity monitoring and network partitioning, which enables users to divide the network into discrete operating units. In addition, network commands can be initiated automatically at specific times to automate network operations further.

Net/Master's second component, Network Integration, provides network-level security to prevent unauthorized access to the network, the spokesman said. It utilizes a single sign-on procedure for access to all applications in the network, and it al-

lows the network operator to "broadcast" messages to terminal users. Through this component, the network can be managed as a single entity, regardless of the individual applications in use.

The Distributed Processing and Data Management Support component is said to support the transmission of data files and data base files around the network.

The purchase price for the Advanced Network Management and Network Integration components is between \$10,000 and \$20,000, depending on the host system. The Distributed Processing and Data Management Support component purchase price ranges from \$20,000 to \$30,000.

Cincom Systems is based at 2300 Montana Ave., Cincinnati, Ohio 45211.

## Cincom offers integrated DSS for IBM micro, MS-DOS users

By John Gallant  
CW Staff

NEW YORK — Five months after the introduction of its mainframe decision support tools, Cincom Systems, Inc. last week extended its decision support system (DSS) offerings to the low end with the announcement of the Series One Plus system.

Well-known for its systems software and data base management system offerings, Cincom has been relatively inactive in the microcomputer software market. Notable exceptions have been its PC Contact micro-to-mainframe link and Cricket, a version of its Mantis application development system for the IBM Personal Computer XT/370.

Not surprisingly, Series One Plus was designed to utilize PC Contact to allow users to upload and download data interactively between a micro and an IBM mainframe. An integrated system offering word and text processing, spreadsheet, graphics, data management, modeling and report writing capabilities, it runs on the IBM Personal Computer and Personal Computer XT as well as a variety of micros utilizing Microsoft, Inc.'s MS-DOS operating system.

Developed by Executec Corp., the Series One Plus DSS is comprised of five tools integrated with the system's Execubus interface. Execubus is said to be an applications and end-user oriented relational view that provides identical user and system interfaces across applications. Integrated tools include:

- Execuwriter, a WP system for drafting, editing, designating page and text layout and printing.

- Execumodel, a tool for planning, analysis and financial modeling that utilizes a simulated columnar "pad" with rows and columns.

- Execufile, an electronic filing system for storing and receiving information. It provides a data management facility for the definition, entry, update, search and display of individual records.

- Execuplot, a business graphics package for data analysis utilizing information from spreadsheet models or from the data base.

- Execureporter, a system for the interactive definition and batch preparation of reports.

The complete set of Series One Plus DSS tools and PC Contact are packaged together. For users of IBM

30 series machines, the mainframe portion is priced at \$30,000 and the micro software at \$1,000 per micro. For IBM 4341 and 4381 users, the mainframe portion is priced at \$20,000 and the micro portion at

\$1,000 per micro. For IBM 4331, 4321 and 4361 systems, the mainframe portion costs \$10,000 and the micro portion \$1,000 per micro.

Cincom Systems is at 2300 Montana Ave., Cincinnati, Ohio 45211.

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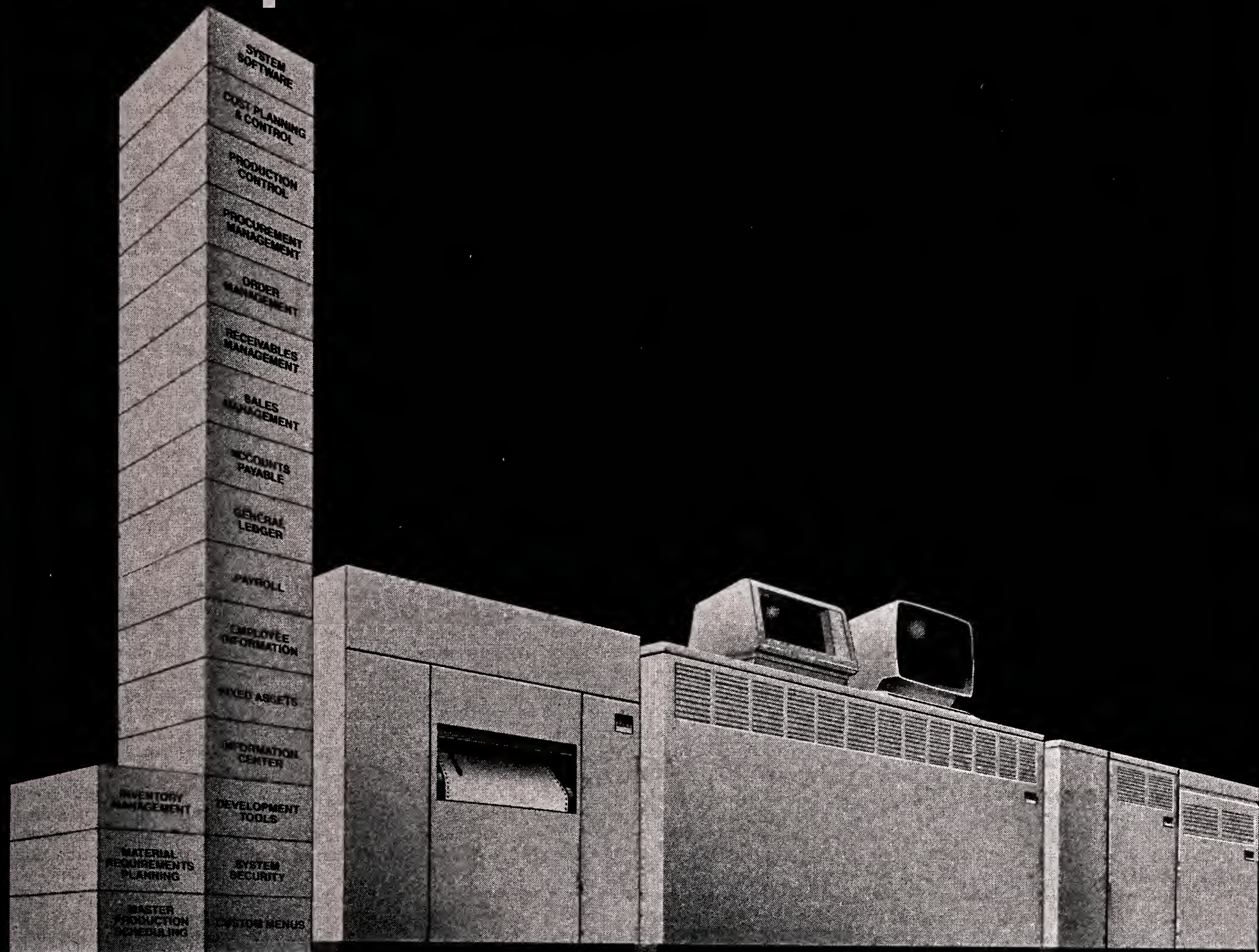


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## NEWS



## A CLOSER LOOK

## DDP from page 1

the Decnet local-area network permits a company to add computer systems "Erector-set fashion, allowing a constantly increasing number of systems that can get on the network without degrading performance," Kalowski said.

But microcomputers are not the cure-all for the problems associated with DDP. For example, difficulties continue to crop up in network management and in gaining access to the central data base, which will remain centralized for the foreseeable future, AT&T's Scanlon said.

Another issue of concern is security. By offering microcomputer users access to corporate data bases, "you've just increased the number of tentacles into that data base, and chances of inappropriate access or sabotage go up," Scanlon said.

And Steve P. Barnhart, director of marketing for NCR Corp.'s VRX oper-

ating system, pointed out that many groups within corporations that are heavily involved with microcomputers got that way because of dissatisfaction with the service provided by the central DP facility. As those departments became more adept at using micros, they began to appreciate the wealth of information stored in the corporate mainframes. Now, the renegade departments are running back to the DP department, seeking access to corporate data bases, Barnhart said.

Yet another problem with micro-based DDP is keeping multiple copies of the same data files up to date. "There are all kinds of heuristic approaches, but none of the solutions is very good," AT&T's Scanlon said.

Additionally, Kalowski noted, distributed networks may come at a cost premium compared with time-sharing systems for data entry or dedicated in-house applications. However, "there's no reason that a time-shar-

ing environment can't be compatible with a distributed computing environment," he said.

*Microcomputers are not the cure-all for the problems associated with DDP. . . . Difficulties continue to crop up . . . in gaining access to the central data base.*

DDP is slowed by technical difficulties and by a lack of demand, some who associate the concept with office automation said. "The idea of a multipurpose network has grown with extreme slowness," said Frederic Withington, vice-president for information systems at Arthur D. Little, Inc. in Cambridge, Mass.

"Most large companies generate a

big data base and bring it into [a] central place for batch jobs," he said. "The data resides centrally most of the time. Despite what distributed data base and personal computer freaks say, most work is batch applications."

DDP, on the other hand, is more appropriate in situations in which many users are working with information and shipping it around, according to Withington. "In the real world, people work with paper documents and imprecise information and all sorts of unfinished material floating across the desk," he said. For large companies, the cost of putting this all on a computer typically is not justified — nor will it be justified until work habits change, he claimed.

"You need a decision support data base, a public data base that is easy to use and electronic mail in which every user can be reached before a lot of people go to workstations," Withington said.

## Unix a key ingredient in the DDP strategy of AT&T

By Eric Bender  
CW Staff

When AT&T launched its first commercial computer systems [CW, April 2], the giant firm strongly emphasized the advantages of built-in distributed data processing (DDP) features.

AT&T's DDP scheme covers several levels of networking, with the firm's Unix operating system a key ingredient throughout, according to Jack Scanlon, vice-president of the company's Computer Systems Division. "We want to get some commonality at the operating-system level not only for our own systems but others, at least commonality at the file-structure level" as a base point for communications, Scanlon said.

The lowest level network is a personal computer network that allows microcomputers to talk to each other and interact with a host server, Scanlon

said. The server controls shared resources and acts as a gateway to larger machines.

Among the benefits of this intelligent network is the fact that users can share expensive printers and large disk drives rather than pile equipment 3-feet high on each desk, Scanlon said. A 1M bit/sec twisted-pair setup, with good host connection, is suitable at this level, he maintained.

At the next level up in networks, the host server could provide either Systems Network Architecture (SNA) connection to mainframes, Ethernet-type connection to mainframes and/or minis or X.25 packet-switched network communications. "Probably the host server needs to be able to do all of this," he said.

AT&T's new line of 3B computers is linked by 3BNet, its implementation of Ethernet, which includes a WE 32000 processor at the front-end in-

terface and features sophisticated administration and maintenance capabilities, the company said.

At the low end, AT&T's 3B2/300 desktop supermicro will link to up to 18 personal computers running Microsoft, Inc.'s MS-DOS operating system. Working through AT&T's PC Interface, the personal computers will be able to share files on the 3B2 and share 3B2 peripherals or function as Unix terminals, AT&T said. The PC Interface is scheduled for third-quarter shipment.

At the high end, AT&T lacks a bridge to SNA networks. "We absolutely have to hook up to SNA," Scanlon acknowledged. The company plans to announce some SNA implementation plans this year.

Because AT&T's computers have just hit the street, the effectiveness of this strategy has not been tested in the general market, observers noted.

## Decnet the foundation for DEC, which plans to push DDP

By Eric Bender  
CW Staff

Digital Equipment Corp. "has always had a leadership role in distributed computing" and will push this concept for all 16- and 32-bit devices, claimed Nathan Kalowski, product group manager for the DEC Professional series of microcomputers.

This month, DEC will begin shipping hardware and software enhancements that allow its Professional microcomputer to join its VAX-11 superminicomputer and its PDP-11 minicomputer as a peer-level node on the firm's Decnet local-area network. Decnet, an implementation of the 10M-bit Ethernet local-area network under Digital Network Architecture, gives all the tools required for central network management, according to John Dubois, product manager for networking.

Decnet now allows users to access applications and files without worrying about whether they are stored on a Professional or any other machine on the network. "This kind of function is already done for you — not just networking, but record and file locking" and so on, Dubois said.

The network's centralized management features allow MIS departments to work much as they do with time-shared systems, according to Dubois. Applications can be developed at a central MIS point and then downloaded to users, while detailed

network management can be carried out from any kind of terminal or workstation, he said.

The network does not place significant, new maintenance burdens on DP departments or boost security concerns, he added.

Pointing out that one key requirement for distributed computing schemes is high compatibility between workstation and servers, Kalowski said that the Professional's file structure is completely compatible with VAX's and PDP's. Additionally, Decnet provides a gateway to Systems Network Architecture and X.25 networks, he noted.

But some DEC resellers said the offering does not address their problems. "We don't see any real value in the Professional under Decnet," said Stephen Levine of TEC Computer Systems, Inc. in Newton, Mass., a DEC distributor. "All they're trying to do is to sell as many personal computers as they can."

"We would want to be able to operate the Pro or the Rainbow on-line to a VAX for data retrieval, but the software isn't written that way. If you have to go to Decnet, that's a very expensive software program to solve a very small problem."

George Colony, from Cambridge, Mass.-based Forrester Research, Inc., maintained, however, that the distributed network strategy "will very sharply differentiate DEC, [Data General Corp.]

and AT&T from [Apple Computer, Inc., Tandy Corp., Compaq Computer Corp. and the like], which just provide workstations. The user is going to require a resource processor or call it a personal computer server. This will handle links from the [personal computer] to the mainframe, control applications and be the link to local nets.

"There's a lot of talk of [micro]-to-mainframe links now, but imagine the cost if every [personal computer] can dial up the mainframe," Colony said. Minicomputers have fallen out of favor now, "but minis will make an extremely strong comeback, closely linked with the [personal computer]. This will help DEC reemerge. The Professional workstation is a first step," Colony said.

### CORRECTIONS

The photo used over Lee Selwyn's name, which accompanied the story "AT&T deregulation benefits for users debated at ICA" [CW, May 14], was inadvertently switched with the photo over Orville Wright's name that accompanied the story "MCI mellows its tone on AT&T."

The correct amount of total attached disk storage at Singapore Airlines [CW, May 14] is 51G bytes, not 5.1G bytes.



## NEWS

# IBM taking the standardization route to DDP



## A CLOSER LOOK

By Tom Henkel  
CW Staff

In efforts to boost distributed data processing functionality in its systems, IBM has earmarked three standardization techniques it hopes will eventually give users a path to data stored on virtually any type of IBM processor.

Not surprisingly, the primary vehicle IBM has chosen to carry out this task is its popular line of microcomputers which, aided by a host of software, provides both direct and emulation links to much of IBM's current processor lineup. But other systems, such as the Displaywriter word processor, Scanmaster image processor and 5520 administrative system, also figure into the IBM distributed data processing equation, according to John Soma, IBM's product manager for office systems planning.

Soma admitted that suddenly making all IBM hardware and software compatible would be an overwhelming and, perhaps, impossible task. So instead of attacking the problem at the systems level, IBM has chosen to make data look compatible to the end user by developing a series of emulations and standardization rules.

In a nutshell, the IBM connectivity strategy centers on three fronts: what goes into a document, how documents are stored and how documents can be shuttled from one system to another.

The bottom element of the strategy is the IBM Document Content Architecture (DCA). This architecture, Soma explained, is a series of rules that define a consistent way of build-

ing documents on IBM systems. The theory is that if a user of multiple IBM systems were to adopt the same basic format in each system, finding and using data located in various corners of a firm would be much easier.

But just adding consistent document creation capabilities to basically incompatible systems will not, by itself, make multiple IBM systems more usable on a corporatewide basis. There is a big difference between operating an IBM Personal Computer and operating a 3080 series mainframe, and Soma said few employees are willing to learn (or are capable of learning) the idiosyncrasies of several IBM systems. Therefore, Soma

said, if by using IBM-developed standards users could develop a consistent way of searching for, retrieving and sending data, the type of system being used (for example, mainframe or microcomputer) would theoretically be less important to the user than the application.

Therefore, Soma said, the second part of the IBM connectivity strategy is the Document Interchange Architecture (DIA). Like DCA, DIA is a series of rules governing how information is found, added, extracted and sent to and from different IBM processors.

The last segment of IBM's strategy involves shipping data from one pro-

cessor to another, especially if processors are in different locations. Here, Soma said, IBM is relying on an old friend — its Systems Network Architecture (SNA). Through SNA Distribution Services, IBM has developed a common architecture for the distribution of asynchronous data that reportedly sidesteps specific systems' or applications' peculiarities.

As with the DCA and DIA, IBM's networking philosophy hinges on consistency. If users can learn a standard way of communicating with multiple IBM processors, Soma said, the size and complexity of the system becomes less of an issue.

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## IBM, SBS can pitch together

WASHINGTON, D.C. — Restrictions barring IBM and Satellite Business Systems (SBS) from making joint sales presentations to customers were lifted by the Federal Communications Commission earlier this month.

An SBS spokesman said the main result will be to give SBS more leverage in selling its products to IBM customers. IBM technical/sales personnel, he explained, will be able to certify that a customer's IBM system will work with the SBS network.

Under restrictions imposed by the FCC when SBS went into business seven years ago, IBM, which owns one-third of the company, was barred from such activity.

The FCC order removing the marketing restrictions was not available at press time, but reportedly will continue to bar certain kinds of anticompetitive cooperation between SBS and IBM. Notably, neither company will be allowed to offer the other's product in combination with its own at a discounted price; and the technical specifications of their protocols and interfaces will have to be disclosed.



## NEWS

# NEC unwraps 16-bit business micro for under \$2,000

By Eric Bender  
CW Staff

NEW YORK — NEC Information Systems, Inc. last week became the first major microcomputer vendor to announce a complete 16-bit business personal computer for less than \$2,000.

The Advanced Personal Computer III (APC III) is an Intel Corp. 8086-based system that runs Microsoft, Inc.'s MS-DOS 2.11 operating system and carries a starting price of \$1,995 for 128K bytes of random-access memory (RAM) and a single 5.25-in. floppy disk drive.

NEC also launched a 10M-byte hard disk version of the APC III, with a base price of \$3,995 and the ability to run Unix. That machine "should become our best-seller," according to G. Millard Allen, vice-president of

systems marketing at NEC.

NEC's Unix (a version of Unix System III with Berkeley enhancements) requires 256K bytes of RAM and the hard disk drive. The software costs \$700, while a Unix memory-management board is priced at \$300.

Software developers represent the major early target market for Unix on the APC III, NEC officials said. Although the new microcomputer is offered as a single-user machine, a multiuser setup would require little modification, noted Francis Kenney, director of marketing support.

Scheduled for July shipment, the APC III is built around an 8-MHz 8086 processor and operates two to

six times faster than 8088-based systems, NEC maintained. The system is functionally compatible with the IBM

Personal Computer, running most IBM PC-DOS software, but not packages that bypass the operating system to call hardware directly, NEC said.

The company is working with software vendors to port over a number of popular business packages for the APC III; more than 100 products reportedly now run on the system.

However, the current list has some notable exceptions, for instance, Lotus Development Corp.'s 1-2-3.

The basic APC III features a 14-in. monitor (monochrome or color) with 640- by 400-pixel display, a Centron-

ics Data Computer Corp. parallel interface and an RS-232 port. The APC III does not accept IBM-compatible expansion boards, according to a spokesman for NEC.

Slated for sale primarily through retail computer stores, the APC III presently offers only asynchronous communications, unlike the original APC, which provides an IBM 3278 emulation option. NEC said it is investigating networking and other communications enhancements for the new machine.

NEC will continue to offer the original APC for applications demanding strong communications and graphics capabilities, the company said.

NEC Information Systems is located at 1414 Massachusetts Ave., Boxborough, Mass. 01719.



APC III

## NEC casts another vote for Unix with its new micro

NEW YORK — Last week's introduction here of NEC Information Systems, Inc.'s Advanced Personal Computer III (APC III), the hard disk version of which offers the ability to run the Unix operating system, marks "the first time that NEC has offered Unix as a product," said Francis Kenney, NEC Information Systems' marketing support director.

Company officials emphasized a strong shift toward Unix, both for NEC Information Systems

and its Japanese parent firm, NEC Corp. The parent firm claims to be the world's third largest supplier of business personal computers priced between \$2,000 and \$10,000.

One official from NEC Corp. estimated that the firm has sold about 390,000 such computers to date.

"Unix is the business operating system of the future," according to G. Millard Allen, NEC Information Systems' vice-president of systems mar-

keting. "It should become the worldwide standard."

Although Unix "is not in widespread use at this point in time," NEC Information Systems President Richard Underwood said, "large corporations are particularly interested in Unix." MIS directors whose larger machines can run Unix programs want to use the operating system on personal computers as well, Underwood maintained.

## Comdex/Spring expected to draw corporate micro managers

By Paul Korzeniowski  
CW Staff

ATLANTA — Microcomputer managers will begin gathering tomorrow at the Georgia World Congress Center, Atlanta Apparel Mart and Atlanta Merchandise Mart for the fourth annual Comdex/Spring '84 conference. More than 850 computer hardware, software and peripheral manufacturers will exhibit products to approximately 45,000 show attendees, according to the show sponsor, The Interface Group, Inc.

Held three times a year to serve the needs of the computer retailer, Comdex has begun to attract a number of corporate microcomputer managers. "These managers have to understand current microcomputer trends and issues," said Linda Yogel, an Interface Group spokeswoman. "Comdex allows them to examine new products and attend seminars that inform them of current product capabilities and future developments."

A number of recently announced products will be exhibited at the show. IBM plans to show its Assistant series of productivity software, which includes word processing, filing, reporting, graphing and accounting applications. Also on display will be Ashton-Tate's just-announced Dbase III (story on page 1) and, for the first time, a multiuser version of Digital Research, Inc.'s recently announced Concurrent PC-DOS, which allows an IBM Personal Computer to run four programs simultaneously



Scene at a recent Comdex show.

using Digital Research's CP/M or Microsoft, Inc.'s MS-DOS operating systems [CW, May 14].

Digital Microsystems, Inc. will demonstrate an enhanced version of its Hinet local-area network, which concurrently runs four operating systems: Digital Research's CP/M 80 and CP/M 86, IBM's PC-DOS and Microsoft's MS-DOS.

Also on display at Comdex will be two recent additions to the portable computer arena, the Hewlett-Packard Co. Portable and Otrona Advanced Systems Corp.'s 2001, which Otrona claimed is 100% IBM Personal Computer compatible. The HP Portable weighs 8½ lb, runs MS-DOS and has Lotus Development Corp.'s 1-2-3 encoded on a read-only memory chip [CW, May 14].

Franklin Computer Corp. plans to show four microcomputers it introduced last week which the company claimed are compatible with Apple Computer, Inc.'s Apple II series microcomputers.

Another microcomputer introduced last week, NEC Information Systems, Inc.'s Advanced Personal Computer III, which runs either MS-DOS or Unix (story on page 8), will also be demonstrated.

New peripherals will also be evident at the show. Epson America, Inc. plans to introduce the JX-80, a seven-color dot-matrix printer. Digital Equipment Corp. said it will add to its printer line with the LA100-PF, a multimode printer with a 240 char./sec print speed in draft mode.

Avatar Technologies, Inc. plans to unveil its PA1000E protocol converter, which reportedly allows any personal computer to access IBM or Ascii mainframes either locally or remotely.

Throughout the show, 46 seminars are scheduled, a number of which may be of interest to the corporate microcomputer manager.

"Unix: A Standard?" is scheduled for Tuesday from 1:00 to 2:30 p.m. Deck Hazen, technical analyst at Yate

Ventures, will chair a panel that includes Anne Wiblad, executive vice-president at Open Systems, Inc.; Mark S. Ursino, president of Technical Service Corp.; Dick Pick, president of Pick & Associates, Inc.; and Charles I. Lombardo, chairman of Multisolutions, Inc.

"Integrated software: A Window on the Future" is slated for 9:30 to 11:00 a.m. on Wednesday. Ester Dyson, president of Edventure Holdings, Inc., will lead a panel that includes John Rizzo, product manager for Apple Computer, Inc.'s Macintosh; John Mercer, vice-president of marketing at the Computer Factory, Inc.; Marvin Goldschmidt, vice-president of business development at Lotus Development Corp.; and Charles Sumonyi, manager of productivity software at Microsoft, Inc.

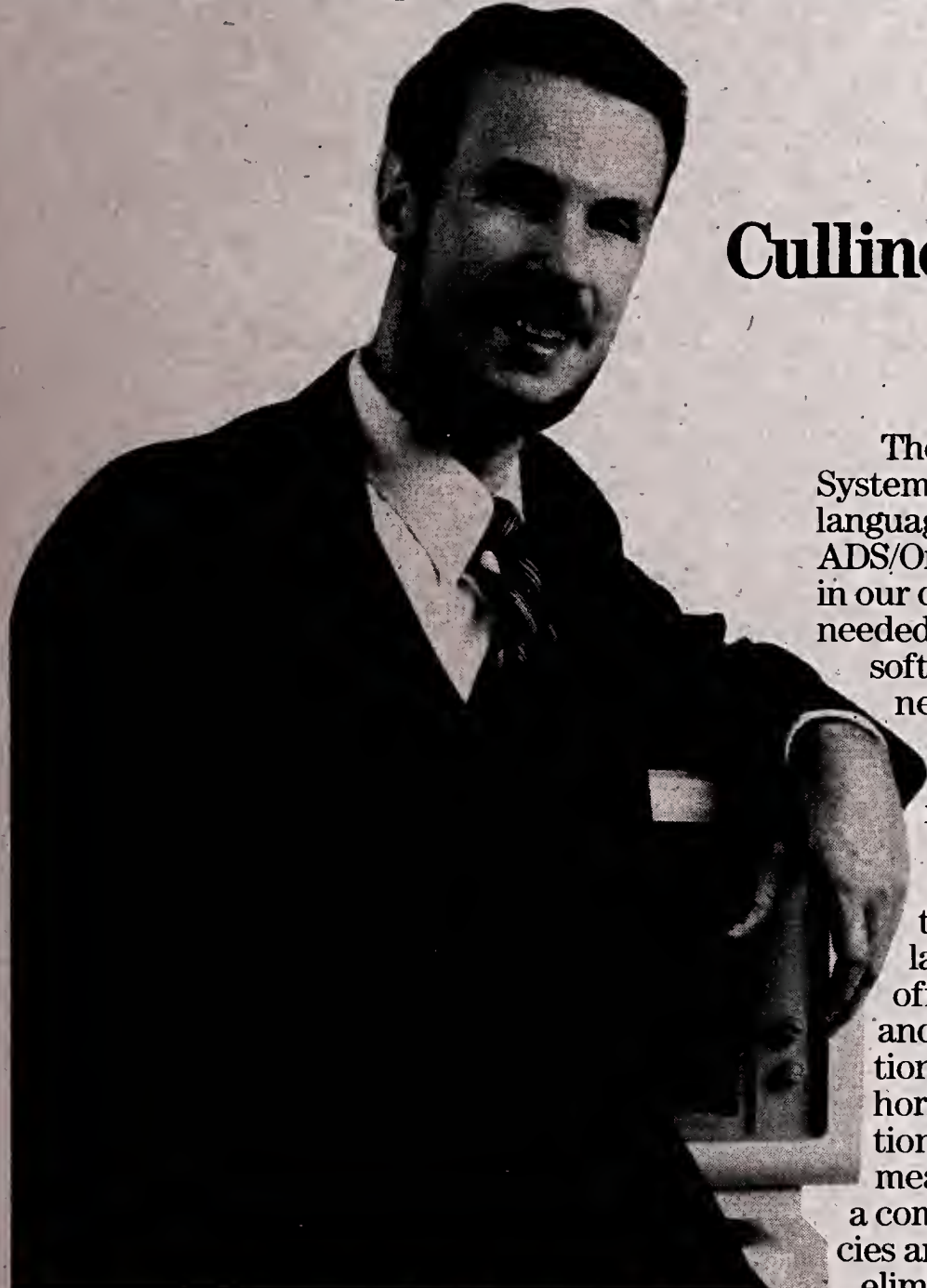
Warren Sargent, president of Strategist, Inc., will chair "Micro to Mainframe Stretch," set for 2:15 to 3:45 p.m. on Thursday. Panelists include J. Robert Harcharek, president of MCI Mail; Gib Hozie, chief executive officer at Context Management Systems, Inc.; and James Dow, president of Microcom, Inc.

For \$195, anyone can attend any seminar and view all products at the four-day conference. The one-day registration fee, which includes admission to the seminars, is \$100; a one-day pass to the exhibits only costs \$25.

The Interface Group is headquartered at 300 First Ave., Needham, Mass. 02194.



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*\*Don Heitzmann is Cullinet’s Director of System Software Development. Don joined Cullinet seven years ago. His early efforts were in design and development of IDMS-DC and he is now responsible for the complete IDMS database product line. Don is a graduate of Princeton University with a B.S. in Electrical Engineering and a Masters in Architecture.*

| City & State       | Date    | City & State             | Date    | City & State       | Date    |
|--------------------|---------|--------------------------|---------|--------------------|---------|
| Albany, NY         | June 12 | Indianapolis, IN         | July 10 | Orange County, CA  | June 19 |
| Anchorage, AK      | May 29  | Kansas City, MO          | June 28 | Ottawa, ON         | June 5  |
| Atlanta, GA        | June 19 | Knoxville, TN            | June 13 | Providence, RI     | June 14 |
| Austin, TX         | June 6  | Lincoln, NE              | June 7  | Raleigh, NC        | June 21 |
| Baltimore, MD      | June 5  | Lexington, KY            | June 27 | Regina, SK         | June 13 |
| Bloomington, IL    | June 26 | Los Angeles, CA          | June 28 | Rochester, NY      | June 21 |
| Cedar Rapids, IA   | June 26 | Merrimack, NH            | June 19 | Sacramento, CA     | June 5  |
| Chicago, IL        | June 12 | Milwaukee, WI            | June 14 | St. Louis, MO      | June 19 |
| Cincinnati, OH     | July 18 | Minneapolis, MN          | June 21 | Salt Lake City, UT | June 27 |
| Cleveland, OH      | July 11 | Montreal, PQ             | June 7  | Seattle, WA        | June 12 |
| Columbus, OH       | June 27 | Montreal, PQ             | June 19 | South Bend, IN     | June 21 |
| Denver, CO         | June 13 | New York, NY             | June 20 | Tallahassee, FL    | June 20 |
| Detroit, MI        | May 23  | New York, NY             | July 24 | Tampa, FL          | June 6  |
| Detroit, MI        | June 19 | New York/Long Island, NY | June 14 | Toronto, ON        | June 21 |
| Fairfield, NJ      | June 7  | New York/Rye, NY         | June 12 | Ventura, CA        | June 26 |
| Ft. Wayne, IN      | July 11 | Norfolk, VA              | June 14 | Washington, DC     | June 28 |
| Ft. Worth, TX      | June 12 | Oakbrook, IL             | July 12 | Wichita, KS        | June 6  |
| Grand Junction, CO | June 20 | Oakland, CA              | June 26 | Winnipeg, MB       | June 12 |
| Grand Rapids, MI   | June 7  |                          |         |                    |         |

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## NEWS

PRODUCT  
SPOTLIGHT

# Supermicros pushing beyond original small business

By Eric Bender  
CW Staff

A step behind the massive invasion of corporate America by personal computers, the more powerful machines broadly defined as supermicrocomputers are finding new applications well beyond their starting niches in small businesses and scientific/engineering work.

There is no agreement on exactly what combination of characteristics defines a supermicrocomputer, and vendors and industry analysts often contradict each other on which systems to include in this grouping of processors. Nevertheless, these are higher end systems built around microprocessor CPUs that fall into two main categories: multiuser systems and dedicated professional workstations.

Each category features tremendous diversity among vendors, systems and target markets. Additionally, the two overlap. AT&T's 3B2/300, for ex-

ample, can be configured either as a multiuser or dedicated system.

Although supermicros may sell against personal computers or other systems, most sales come at the expense of minicomputers. Built around today's powerful and inexpensive microprocessors, supermicros hold a strong price/performance edge over traditional minicomputers.

One notable price/performance comparison can be made between Digital Equipment Corp.'s VAX-11/785 supermini and Intel Corp.'s 80286 chip. According to Lew Glendenning, director of information systems research at Strategic, Inc. in San Jose, Calif., the VAX works at between 1.5 million instructions per second (Mips) and 2 Mips, while the 80286 is a 1-Mips machine. But some new 80286-based systems cost less than one-sixth the nearly \$195,000 starting price of the VAX-11/785.

Several ongoing trends will further boost supermicro price/performance. Because microproces-

sors now represent such a small fraction of system costs, a processor can be dedicated for each user, disk drive or other function. "We're actively engaged in sprinkling around microprocessors," said Bill Godbout, president of Compupro Corp. in Hayward, Calif.

Moreover, during the next year, many vendors now offering computers based on 16/32-bit chips will introduce systems built around full 32-bit chips with enhanced memory management and other advanced features. "By 1985, full 32-bit [chips] will be the new standard level for supermicros," predicted Laura Stewart, an analyst with the Yankee Group in Boston.

Supermicrocomputers also will benefit from hard disk drives' plummeting prices, the introduction of new integrated software packages, emerging communications and graphics standards and other communications advances that are helping to integrate the new systems within larger data

## Supermicros — Multiuser Systems

| Vendor   | System             | Number of Users | CPU   | Internal Memory (in bytes) | Hard Disk Storage (in bytes, formatted) | Operating System(s)   | Communications Capabilities  | Starting System Price           |
|--|--------------------|-----------------|---|----------------------------|---|---|--|---------------------------------|
| Alpha Micro Systems<br>Irvine, Calif.                | AM-1092            | To over 40      | Motorola, Inc.<br>68000   | 512K-<br>over 4M           | 400M-3G                                 | Amos,<br>(proprietary)<br>CP/M  | Peer, 2780/3780<br>emulation   | \$56,000                        |
| Altos Computer Systems<br>San Jose, Calif.           | Series 986         | 1-9             | Intel Corp.<br>8086   | 1M                         | 42M-84M                                 | Xenix,<br>MP/M-86   | Worknet (proprietary),<br>3780 emulation and<br>3270 emulation<br>(optional)                             | \$12,990                        |
| AT&T<br>New York                                     | 3B2/300            | 1-18            | AT&T<br>WE 32000 (32-bit)   | 512K-2M                    | 10M-32M                                 | Unix System V   | 3Bnet<br>(implementation<br>of Ethernet)   | \$ 9,950                        |
| Cado Systems Corp.<br>Torrance, Calif.               | Tiger<br>ATS-64    | Up to<br>64     | Up to 8 Intel<br>8086 transaction<br>processors, one 8086<br>intranet processor,<br>one 8089 control<br>biprocessor | 256K-1M                    | 30M-1G                                  | Multimaster<br>Interpretive Operating<br>System (proprietary)<br>CP/M                                     | Asynch.,<br>IBM Bisynch.   | \$33,000                        |
| Convergent Technologies, Inc.<br>Santa Clara, Calif. | Miniframe          | 1-8             | Motorola<br>68010   | 512K-2M                    | 10M-37M                                 | Ctix (version of<br>Unix System V)  | 2780/3780, 3270<br>Bisynch.; 3270 and<br>3770 SNA; X.25  | \$ 5,000<br>(OEM<br>quantities) |
| Convergent Technologies, Inc.<br>Santa Clara, Calif. | Megaframe          | 8-128           | Motorola 68010 plus<br>two Intel 80186;<br>maximum of<br>36 processors  | 1M-27M                     | 38M-over 3G                             | Ctix (version of Unix<br>System V) for<br>68010 processors;<br>Ctos (proprietary)<br>for 80186 processors | 2780/3780, 3270<br>Bisynch.; 3270 and<br>3770 SNA; X.25  | \$20,000<br>(OEM<br>quantities) |
| Digital Equipment Corp.<br>Maynard, Mass.            | Micro/<br>PDP-11   | Up to<br>10     | DEC 11/23<br>(16-bit)   | 256K-4M                    | 10M-32M                                 | RT-11, Micro/RXS,<br>RSX-11M,<br>Micropower/Pascal,<br>V7M-11,<br>Micro/RSTS                              | Decnet (implementation<br>of Ethernet)<br>with SNA gateway<br>and X.25<br>network support                | \$10,000                        |
| Digital Equipment Corp.<br>Maynard, Mass.            | Microvax 1         | 1-4             | DEC KD32-AA<br>(32-bit)   | 1M                         | 10M-32M                                 | Micro VMS,<br>Microvax Ultrix<br>(version of Unix)  | Decnet (implementation<br>of Ethernet)<br>with SNA gateway<br>and X.25<br>network support                | \$13,000                        |
| Fortune Systems Corp.<br>Redwood City, Calif.        | 32:16<br>XP        | 1-16            | Motorola<br>68000   | 512K-1M                    | 20M-30M                                 | FOR: PRO (version<br>of Unix System 7)  | Peer; 3780, 3270<br>Bisynch.; VT100<br>emulation; file transfer<br>to Wang Laboratories,<br>Inc. systems | \$12,995                        |
| NCR Corp.<br>Dayton, Ohio                            | Tower<br>1632      | Up to<br>16     | Motorola<br>68000   | 512K-2M                    | 32M-200M                                | Proprietary<br>Unix-based   | Peer, SNA, batch   | \$13,295                        |
| Onyx Systems, Inc.<br>San Jose, Calif.               | C5012V             | 5-11            | Zilog, Inc.<br>Z8000  | 512K-1M                    | 14M-42M                                 | version of Unix<br>System III   | 2780 Asynch.,<br>3780 Synch.   | \$14,000                        |
| Plexus Computers, Inc.<br>Santa Clara, Calif.        | P/60<br>Model 1060 | Up to<br>40     | augmented Motorola<br>68000   | 512K-4M                    | 72M-580M                                | Sys 3 (version of<br>Unix System III)   | 3270 and 2780/3780<br>emulation, proprietary<br>network  | \$42,950                        |

CW chart

This chart illustrates the diversity of multiuser computer systems built around one or more microprocessor CPUs. The prices of the models shown here start at \$5,000 in OEM quantities and rise to roughly 10 times that amount. CPUs range from the single Intel 8086 chip in Altos' Series 986 to the multiple Motorola 68010 and Intel 80186 chips in the Convergent Technologies Megaframe, which is said to offer up to 8 Mips performance. This chart shows only a small fraction of supermicros now available, and most of the vendors represented here offer other supermicros as well. Moreover, for reasons of space, other significant suppliers of multiuser micros have been excluded.



# scientific niches into new application areas

processing environments.

However, other factors are equally crucial to market success, and Glendenning noted that supermicros make up "a much smaller market than you would think, hearing of the price/performance."

Among the gaps, the most important may be a limited choice of applications software. "A supermicro is a high-performance minicomputer with no software," Glendenning joked. Other problems facing the acceptance of supermicros include the loyalty of users to their minis and the unwillingness of many systems houses and OEMs to work within much lower price margins.

**Multiuser supermicros**

The multiuser systems displayed in the chart on page 10, chosen to illustrate the market's diversity, merely hint at the host of available products. And there's no lack of vendors.

"There are over 100 companies offering [Motorola, Inc.] 68000-based systems which run some version of Unix," Stewart said. "It's getting close to a commodity market."

The supermicro marketplace is "a wild area, with 30 to 40 hardware vendors shipping 100 systems a year or less," estimated Michael Dubrall, a managing analyst at Yates Ventures in Los Altos, Calif.

Numerous manufacturers, such as Plexus Computers, Inc. of Santa Clara, Calif., have designed supermicro systems primarily for scientific/engineering applications. Most of these firms based

their systems on the Motorola 68000 family, but others chose chips from Intel Corp., National Semiconductor Corp. or Zilog, Inc. In this market, raw performance typically has been considered the edge, and many of the vendors compete on what Glendenning calls "pure spec-manship."

Other vendors, such as Altos Computer Systems, Inc. in San Jose, Calif., have migrated their product lines up from 8- to 16-bit systems and emphasized small to medium-size business sales.

And then there's Convergent Technologies, Inc. of Santa Clara, Calif., which builds systems for full-service OEMs. "Convergent doesn't have competitors," Stewart remarked. "No one else wants to play so close with the margin."

Although relatively small firms pioneered supermicros, major vendors are now competing, and the market is still defined by DEC. Multiuser supermicros typically sell directly against DEC minicomputers. DEC also sells its own supermicros, the Micro/PDP-11 and Microvax 1, but analysts say those systems entered the market late and have not grabbed the expected market share.

"I thought the Micro/PDP-11 would be more competitive, but it has limited flexibility and limited size," said Gary Horning, marketing program manager for Tower systems at NCR Corp. in Dayton, Ohio. Yates Ventures' Dubrall claimed "the [Micro/PDP-11] is a quiet product because DEC hasn't figured out how to market it. DEC should market it as a low-end, almost stand-alone system that hooks into [the VAX environment] in distrib-

uted fashion, but it's not even offered with the same operating system."

Stewart, however, maintained that DEC hasn't lost that much market share. "DEC is still the system to beat. End users are still pretty loyal to VAX and the VAX environment. . . . The Microvax is late, but it's there."

**'Beautiful-looking machines'**

Another, more recent entry is the AT&T 3B2/300, an inexpensive 32-bit system. Technically, "the Bell 3Bs are beautiful-looking machines," said Compupro's Godbout, who added that AT&T's implementation of the proprietary WE 32000 microprocessor has produced high-end VAX performance.

AT&T "is going to be a very powerful member of this marketplace," Horning predicted. "However, now they're merely offering systems. It will take them a while to learn the ins and outs of marketing."

Stewart agreed that "AT&T will be extremely influential in this market," but added that "IBM will rake in the lion's share. Right now, AT&T is able to grandstand in the vacuum of IBM's silence, but it's not going to last that way."

"Everyone expects IBM to come in," Dubrall concurred. He expects a machine to emerge based on the Intel 80286 chip, running versions of AT&T's Unix and Microsoft, Inc.'s MS-DOS operating systems.

See SUPERS page 12

## No agreement among industry experts on supermicro definition

This story assumes a broad definition of supermicrocomputers: either multiuser or dedicated workstations built around one or more microprocessor CPUs.

Within the industry, however, there is no agreement on this definition — or any other. Supermicros fall somewhere between desktop personal computers and superminis, but nobody can say just where.

For multiuser systems, a functional definition might cover machines that support more than 16 users with reasonable response time, according to Lew Glendenning, director of information systems research at Strategic, Inc. "But that's not the definition everyone uses, because it's hard to quantify," he observed.

Glendenning noted that another potential definition might require 32-bit processing (either in the chip's internal data paths, as in the case of

the Motorola, Inc. 68000, or throughout the system, as in the case of full 32-bit chips). However, this approach may give a misleading impression of performance. As an example, Glendenning mentioned systems offered by Molecular Computer of San Jose, Calif., built with multiple 8- or 16-bit processors and able to outperform some 68000-based products.

Other experts agree, pointing to the performance available with 16-bit designs, which feature coprocessors, multiple CPUs or powerful new chips such as the Intel Corp. 80286.

Dataquest, Inc.'s James Renalds also noted the difficulty of nailing down what supermicro means, but suggested a 16- or 32-bit machine that supports five to 30 users, includes at least half a megabyte of random-access memory, expandable to 4M bytes, features minimum hard disk drive storage of 10M bytes, expandable to at least 20M

bytes, and offers tape backup as standard.

Bill Godbout of Compupro Corp. suggested that supermicros be defined by example, and said that a machine built around the 68000 "barely makes the cut" because of limitations on the chip design level. "Machines based on the [National Semiconductor Corp.] 16032 and 32032 and the [Intel] 80386 — these are supermicros," he said.

On the workstation side, Apollo Computer, Inc.'s Anil Gadre said that drawing the line is "a funny problem" because even his firm's low-end products provide superminicomputer power.

"To one person, a supermicro is a personal computer; to another, it's a Sun [Microsystems, Inc.] workstation," commented Yates Ventures' Michael Dubrall. "We gave up defining micros, supermicros and minis last year. We divide the market by cost. You're really in deep mud trying to define supermicro."

| Supermicros — Technical/Professional Workstations |                   |   |                            |   |  |  |  |
|---|-------------------|---|----------------------------|---|--|--|--|
| Vendor  | System            | CPU   | Internal Memory (in bytes) | Hard Disk Storage (in bytes, formatted) | Operating System(s)                                    | Networking   | Starting System Price                          |
| Apollo Computer, Inc. Chelmsford, Mass.           | DN320             | Motorola, Inc. 68010                            | 1.5M                       | 34M-70M (higher on network)             | Aegis (proprietary), AUX (proprietary version of Unix) | Domain, proprietary 12M bit/sec token-passing ring | \$23,400                                       |
| Hewlett-Packard Co. Palo Alto, Calif.             | HP 9000 Model 540 | proprietary (32-bit), up to two additional CPUs | 512K-2.5M                  | 28M-over 3G                             | HP-UX (proprietary version of Unix System III)         | Shared Resource Management, Ethernet               | \$35,350 (excluding hard disk drive, terminal) |
| Sun Microsystems, Inc. Mountain View, Calif.      | Sun 2/120         | Motorola 68010                                  | 1M-4M                      | 42M-130M (higher on network)            | Unix (4.2 bsd version)                                 | Ethernet   | \$16,900 (excluding hard disk drive)           |

Numerous companies offer high-performance workstation products built around microprocessor CPUs. This chart shows one sample product from each of several major vendors, all of which offer a broad line of workstations. Although some supermicro workstations support multiple users, they typically are dedicated to professionals with high requirements for computing power. A local-area network typically allows sharing of programs and data between workstations.



## NEWS

PRODUCT  
SPOTLIGHT

## Supermicro operating systems: Unix heads the list

When it comes to software, supermicrocomputers may run proprietary operating systems or other popular system software — Digital Research, Inc.'s CP/M, for example, or the Pick & Associates, Inc. Pick operating system — but some version of Unix almost always heads the list. Almost every machine shown in the charts on pages 10-11 runs Unix in one form or another.

Although supermicro vendors almost uniformly have adopted Unix, the industry seems to split into those who push Unix hard and those who cannot quite take it seriously.

The strongest push comes from AT&T itself, whose new computer systems run only Unix System V. The giant firm is heavily promoting System V in general. "From now on, consider it standard," widespread AT&T advertisements claim.

"You can't open a copy of *Good Housekeeping* without seeing these ads," joked William Zachmann, vice-president for corporate research at International Data Corp. in Framingham, Mass. However, Zachmann called AT&T's drive for Unix "a colossal blunder" because of performance limitations and relatively sparse use outside AT&T to date.

Others also downplay the current importance of Unix in general and System V in particular. "I deny there is a Unix market," said Lew Glendenning, director of information systems research at Strategic, Inc. in San Jose, Calif. "There are markets in which Unix is an acceptable or preferred operating system. I don't think System V is a be-all and end-all."

The Unix market often draws on a specialized clientele, noted Laura

Stewart, an analyst with The Yankee Group in Boston. In the mini world, much demand for Unix comes from technical end users who want to use what they learned in college, she said.

However, the Unix momentum keeps growing, according to analysts. "It's realistic to think that every computer company in the U.S. is considering a move to Unix," said Michael Dubrall, a managing analyst at Yates Ventures in Los Altos, Calif. "The whole concept of proprietary operating systems is going away."

"The market is moving toward a single operating system, slowly but surely," said James Renalds, manager of very small business computer research at Dataquest, Inc. in San Jose, Calif. "I think it will be System V."

Companies offering Unix versions generally are making the shift to System V, more to follow a standard than to add enhancements. For example, Microsoft, Inc. is moving its Xenix operating system to System V this year, although System V "will add zero features to our current implementation," President Jon Shirley said.

Proponents emphasize Unix's program portability, ease of programming, built-in communications capabilities, reliability and a host of other features. But the standardization issues are key, observers said.

"I don't think Unix itself is so all-important. What is important is the trend, particularly among large corporations, toward standards allowing portability and compatibility," commented Gary Horning, marketing program manager for Tower systems at NCR Corp. "Unix is centering that attention."

## SUPERS from page 11

IBM's System 9000 family represents an entry in the supermicro workstation arena, and many predict that IBM will soon launch not one but several multiuser products. Meanwhile, IBM's System/36 Model 5362 minicomputer seems very much like a supermicro, with a starting price of \$13,000 and the ability to fit under a desk. The "baby" System/36 represents powerful competition for supermicros, marketing experts said.

### Changing rules

As larger vendors enter the arena, the rules for competing are changing. "The supermicro vendors think they're elbowing with each other, but they're largely dependent on how some of them go in and wrestle with the DEC's, the Hewlett-Packards and the IBMs," Stewart said.

"With the vast influx of competition and the influx of marketing types, they're starting to specialize," Glendenning added.

Vendors must offer not only performance but "a full product — that means documentation, packaging, training, salesmanship, distribution," Dubrall said. "The next big battle is going to be over distribution channels, not technology. The large companies with huge manufacturing

capabilities will dominate."

Both vendors and analysts predicted a growing role for multiuser supermicros in large corporations. "Supermicro vendors are offering IBM compatibility in an IBM environment," observed James Renalds, manager of very small business computer research at Dataquest, Inc. in San Jose, Calif. "I think they'll gain penetration." He noted that the systems can provide high-performance and high-storage capabilities for general use or for specific departments.

"The IBM mainframe environment is not being replaced overnight," Stewart said, but she does see "a proliferation of multiple environments" open to other vendors through Systems Network Architecture gateways or simple terminal emulation. "We have big clients who are looking for outside vendors in certain niches who wouldn't have looked before. It's generally a Big Blue environment, but others can net into a larger system."

### Technical/professional target

The second major type of supermicro is the technical/professional workstation. This is typically a desktop system offering more power than a standard personal computer, configured for specific applications

See SUPERS page 13

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## NEWS

# Single-user workstations dominate conference floor



CW AT NCGA

By Jeffery Beeler  
CW West Coast Bureau

ANAHEIM, Calif. — The growing influx of 16- and 32-bit microprocessors into single-user workstations has wrought a price/performance upheaval that was clearly in evidence last week at the National Computer Graphics Association's (NCGA) annual conference.

Rapid advances in microprocessor technology have enabled workstation manufacturers to increase their products' intelligence greatly, yet minimize the terminals' prices, according to former NCGA President William Howard. Nowhere was the dramatic improvement in hardware price/performance more graphically illustrated than at the fifth annual NCGA show, where single-user workstations accounted for a large share of the conference's formal product introductions.

Typical of the freshly announced wares were computer-aided engineering tools from vendors like Saber Technology Corp., Ridge Computers, Inc., California Computer Products Inc., Paragon Technology Corp. and

Vectron Graphic Systems, Inc.

Saber's contribution to the NCGA show's workstation parade is built around a 32-bit National Semiconductor Corp. 32032 reportedly operating at 1.2 million instructions per second (Mips), an execution rate equivalent to the performance of a Digital Equipment Corp. VAX-11/780. Intended mainly for computer-aided design and engineering, the Saber Station incorporates proprietary circuitry that permits the product's 19-in. display to hold up to 2M pixels simultaneously, according to Dennis Peck, Saber president.

Saber Station costs less than \$40,000 and is available from its manufacturer at 2381 Bering Drive, San Jose, Calif. 95131.

Like its Saber counterpart, the Ridge 32S qualifies as a 32-bit single-user workstation and is optimized primarily for CAD applications. With its Unix-derived operating system, the workstation reportedly operates at 8 Mips and, in a basic configuration, costs \$36,400 from Ridge at 2451 Mission College Blvd., Santa Clara, Calif. 95050.

Another 32-bit workstation that made its official debut at last week's show was Calcomp's System 25, which reportedly suits applications such as architectural design, engineering, construction and facilities

planning. The VAX-compatible System 25 supports Unix and automatically generates bills of material, drawings and secondary data.

Priced at \$65,000, the workstation becomes available for shipment next month from Calcomp at 2411 W. La Palma Ave., Anaheim, Calif. 92801.

Also introduced at the NCGA conference were Paragon's Model 42 Multi-Tasker and Vectron's PC Design Automation System, both geared primarily for designers of printed-circuit boards. The 32-bit Model 42 reportedly relieves larger processors of tasks like autorouting and design rule checking and costs \$30,000 from Paragon at 2199 Norse Drive, Pleasant Hill, Calif. 94523.

Meanwhile, the PC Design Automation System performs every phase of circuit board design, from schematic entry to output of finished artwork, according to Vectron. The product sells for \$37,500 and is available from Vectron at 2910 Corvin Drive, Santa Clara, Calif. 95051.

## AI workstation

Last week's NCGA show also coincided with the announcement of an artificial intelligence workstation from Perq Systems Corp. When running the company's own microcoded implementation of Common Lisp, Perq AI is said to equal the power of a VAX-11/780 for a fifth of the price.

The workstation accommodates Perq's Accent operating system and its Linq local networking facility, both of which were also announced at the NCGA show. Perq describes Accent as a multiprocessing system that provides 32-bit virtual memory addressability across an entire local network. Linq uses Ethernet-based technology to allow Perq's workstations to communicate with each other and share systems resources from assorted vendors.

Perq AI costs less than \$40,000, with Accent adding \$1,000 to the price, and will become available in

July from the company at 2600 Liberty Ave., Pittsburgh, Pa. 15230.

Joining Perq in introducing graphics-oriented displays at the NCGA conference were vendors such as Control Data Sciences, Inc. (CDS), CIE Terminals, Inc., Seiko Instruments U.S.A., Inc. and Peritek Corp.

CDS's offering is aimed mainly at text processing rather than engineering applications and can receive up to 12M byte/sec, with a drawing speed of 39.6M pixel/sec, according to a company source. The Video Scroller Terminal sells for less than \$6,000 and will become available during the third quarter from CDS at 2560 Mission College Blvd., Suite 102, Santa Clara, Calif. 95050.

The CIE terminal, meanwhile, was described by a company spokesman as a dual-personality monochrome unit that emulates both the Tektronix, Inc. Models 4010 and 4014. Capable of 640- by 480-dot resolution, the CIT-414a costs \$1,495 and can be obtained from CIE at 2505 McCabe Way, Irvine, Calif. 92714.

In other NCGA-related product moves, Seiko last week enhanced its existing GR-1104 line of color graphics terminals to support display list capabilities and emulate the DEC VT100 terminal. The GR-1104's display list memory comes in two quantities — 256K and 512K bytes.

In its 256K-byte configuration, the display list memory costs \$2,500, compared with \$400 for the VT100 emulation option. Seiko's Graphic Devices and Systems Division is located at 1623 Buckeye Drive, Milpitas, Calif. 95035.

Peritek's system, by contrast, features a modular design that reportedly enables the product to be tailored to hundreds of graphics applications and to change its system software environments in less than a minute.

Volume shipments of the \$14,000 graphics system are slated to begin in August from Peritek at 5550 Redwood Road, Oakland, Calif. 94619.

## SUPERS from page 12

with a high need for number crunching, such as computer-aided design (CAD), and linked to other such workstations as well as larger machines by a local-area net.

Such workstations emerged to solve technical tasks, but the target focus is broadening, vendors said. "Workstations originally came into being and are still primarily used in a very CAD-type of work," said Anil Gadre, product group manager for low-end systems at Apollo Computer, Inc. in Chelmsford, Mass. "But we're evolving. We're moving more toward a very glorified personal computer."

The targeted technical employees now include "the group of people in the support services environment: the clerks, the engineering managers, the technical document illustrators and the writers," Gadre said. "It's not only those who do conceptual design and analysis."

In addition, vendors are beginning to supplement software for technical tasks with software for solving general administrative problems. "In addition to their main work, a lot of people want to talk to their colleagues [via electronic mail], write monthly memos and so on," Gadre said.

"For the eventual end user, the workstation will become the major part of their working surface," said Beau James, a product manager at Sun Microsystems, Inc. in Mountain View, Calif. "As an example, in mechanical drafting, we replace a drawing board, T-squares and rules with a workstation and software."

While James said, "I don't think we're trying to put a workstation-type machine on every manager's desk," he noted that "we are selling to traditional white-collar employees, not just engineers. Whoever the end users are, they also have many

office automation requirements, particularly in communications."

Customers are adopting supermicro workstations more widely as prices for low-end models creep downward, vendors agreed. "There's a real trend toward lower cost," James said. "At some magic threshold, no one knows where, costs will become only a minor concern."

## Pluses and minuses

Like multiuser supermicros, technical supermicro workstations typically sell against minicomputers. A cluster of workstations may compete against an OEM selling a turnkey mini with graphics terminals or against a minicomputer manufacturer selling a supermini.

"Compare [the workstation] to a VAX-11/780," James said. "Any of the machines in the cluster has roughly one-third the brute performance of an 11/780, but you have 'n' of them, 12 or 15 or more. It's not atypical to end up with more raw CPU power and more raw megabytes of storage."

Dedicated workstations with high-resolution bit-mapped display, mice and other handy features allow users "to be much more productive than they would with a standard terminal," James said. Other advantages include predictable response time ("well-paid people are the target users") and the workstation network's redundancy.

"On the drawback side, at the present time workstations are more complicated to install and maintain than time-sharing terminals, James said, and users may require longer training periods. However, he noted that daily maintenance is not a large concern. With more than 150 workstations connected at Sun headquarters, "we have no one in the computer room most of the day. Someone comes in at night to do backup."

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## NEWS

# Bank institutes disaster recovery plan just in time



CW AT NOAC

By James Connolly  
CW Staff

WASHINGTON, D.C. — Banks can learn from the experience of some lucky Minneapolis bankers who saw their business go up in flames only months after they implemented a disaster prevention and recovery plan, according to a retired vice-president of that bank.

The morning after a Thanksgiving 1982 blaze lit up the Minneapolis sky and gutted what officials thought was an indestructible building, Norwest Bank started its recovery effort, said Virgil M. Dissmeyer at the American Bankers Association National Operations and Automation Conference here last week.

"We were lucky," Dissmeyer summarized. Only six months earlier, the bank had completed implementation of the contingency plan it began drafting in 1978. Part of that plan was the relocation of the check processing and wire-transfer functions to remote sites.

"We probably could have come back without a plan, but certainly not as well," he said to the bank operations managers. Eighteen months after the fire, Norwest is operating out of eight locations and planning a new building on the old site.

Dissmeyer urged the other bankers to adopt similar contingency plans and outlined recommended procedures. "Assess the risk. Ask yourself, 'What if the worst possible thing happened?'" he advised.

In Norwest's case, the fire was

worse than expected and couldn't be avoided by the bank because it spread from a neighboring building.

A bank's approach to a contingency plan will vary according to its own circumstances, such as the number of branches and the location and dispersal of its data processing operation. The bank should assign development and implementation of the contingency plan to personnel who understand all phases of the business. The plan needs the support of executives and must be documented and tested, he added.

The stages of the plan are detection, usually by security personnel; reaction, such as evacuation of the building and securing valuables; assessment of the damage; notification

and mobilization of key people — 200 personnel summoned from throughout the country by a telephone call tree in the Minneapolis case; restoration of service; and reconstruction — a five-year task for Norwest.

Dissmeyer called data processing the foundation of most banks, which justifies having data stored at several sites. But he also stressed that microfilm is valuable for maintaining records of "who owes us money and who we owe money to."

Speaking with Dissmeyer, Ross E. Markley, president of Contingency Design, Inc. of Columbia, S.C., said the loss of check processing capability can kill a bank in a matter of days. He said that even if a bank has a backup "shell" building, the time needed to get it equipped is a drawback.



CW photo by J. Connolly  
Dissmeyer



CW photo by J. Connolly  
Markley

## Banker explores relationship between vendor, user at ABA meet



CW AT NOAC

By James Connolly  
CW Staff

WASHINGTON, D.C. — User organizations have the tools — such as regular communications and contract lawyers — to manage their vendors and assure performance and service for their computer equipment, a group of bankers was told here last week.

Those tools should be used first at the shopping stage, with the buyer carefully examining the qualifications of the vendor, and should continue through installation and daily use, Ronald W. Davies, vice-president of Maryland National Bank, advised attendees at the American Bankers Association's National Operations & Automation Conference.

"Address the fundamentals," warned Davies, who was joined by Affiliated Computer Systems Inc.'s Senior Vice-President Otis Rogers in discussing vendor management.

"Spend time with your vendor and make sure that he or she knows how you plan to measure performance. Simply stating that the response time

for transaction A should be less than two seconds 98% of the time is inadequate," Davies cautioned.

He urged the bank operations managers to contract with vendors only after ensuring that the vendor can meet their specifications. "Don't be afraid to negotiate. Don't sign a standard contract," he added, advising the bankers to hire attorneys who know banking and data processing to develop individualized vendor contracts. He said a contract should specify how the vendor should respond to a problem and the user's options.

He encouraged the bankers to doc-

ument any good experiences as well as problems that they have with a vendor's product and to schedule meetings regularly with the vendor's executives. "Just knowing that an executive-level meeting takes place on a regular basis tends to keep peo-

ple at both ends on their toes. It at least makes sure things get cleaned up quarterly," he noted.

Other communications include courtesies, such as notifying the vendor of key personnel changes in the systems department, Davies said.



CW photo by J. Connolly  
Davies

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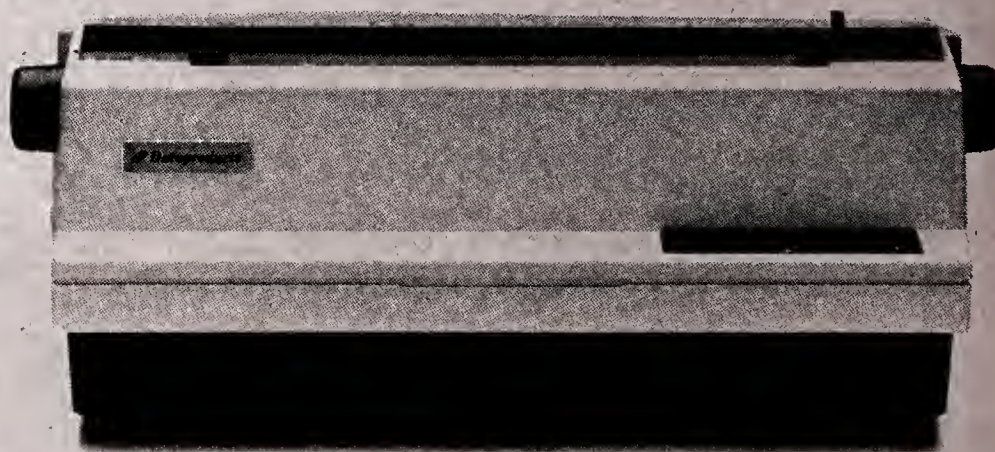
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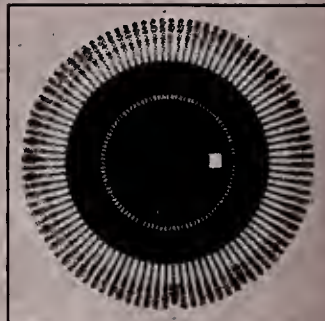
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## NEWS

# Incoming ABA chief urges fees for DP-based services



CW AT NOAC

By James Connolly  
CW Staff

WASHINGTON, D.C. — The president-elect of the American Bankers Association (ABA) said last week that financial institutions can survive only if they charge fees to cover the cost of the computer-related services that customers demand.

James G. Cairns Jr. also claimed that legislators who consider limiting such fees and who favor institutions other than banks that now offer loans and services such as automated teller machines (ATM) do not understand how much computers cost the banks.

"It used to be true that banks often charged customers nothing or

nominal fees for many of the services we provide," Cairns said at the ABA's National Operating and Automation Conference (Noac) here. "But back then, the saver subsidized those bank services by receiving less than market value rates on deposits. That was unfair.

"It took years for bankers to convince Congress to allow us to pay market rates for deposits, but it finally came about. The saver now receives a fair return, but at the cost of removing the subsidy for other services."

The computer has allowed banks to offer 24-hour convenience through ATMs and longer office hours because tellers have less paper to deal with during the afternoon hours, he noted. "But the computers and the related technology don't come cheap. Over the last 10 years, the cost of running a bank — the cost of technol-

ogy, buildings and people, primarily — has risen dramatically," Cairns pointed out.

He added, "The public demands the services we provide. If we don't fulfill those demands using the marvelous technology that surrounds us, someone else will. And they will charge a fee for their services to reflect the cost of doing business, just as we must do."

Cairns noted that some congressmen have complained that banks are charging exorbitant fees for services. But while no fee-limiting legislation is pending, he urged the U.S. Congress to let banks move into new fields, such as insurance, and to limit bank services to organizations that qualify as banks under Federal Deposit Insurance Corp. guidelines.

Cairns said that competitors like

American Express Co., Sears Roebuck & Co. and J.C. Penney Co. are making inroads into the heart of banking — electronic payment systems.

At the retail level, less than 30% of charge and debit cards are issued by banks, and the nonbank companies are expanding their services. At the wholesale payment level, banks are still preeminent, but are not guaranteed the top position in the future, Cairns noted.

American Express' First Data Resources now processes one out of five credit-card transactions in the U.S., while Sears and several other companies are moving into the home banking field.

"The banking system is losing control over the last unique service it has to offer — the movement of money — because nonbank competitors are developing their own sophisticated payments systems," Cairns said.



CW photo by J. Connolly

## Operations managers seen vital to era of diversified banking

By James Connolly  
CW Staff

WASHINGTON, D.C. — Computer operations managers will become increasingly important to banks and will be at the center of the transition as banks move into a new era of di-

versification, the American Bankers Association National Operations and Automation Conference was told last week.

The keynote speaker, John S. Reed, vice-chairman of Citibank of New York, said the changing banking

scene means that operations managers may be responsible for moving banks into areas such as insurance and brokerage services.

"We're not really in the commercial lending business today; it's probably not profitable anymore. We're doing more processing than lending. Historically, lending was fundamental, but it's not anymore — it just doesn't pay the freight. It's the other services that we provide that provide the revenues," Reed said.

Operations personnel now go on commercial sales calls, once an unthought-of practice, which indicates the direction that banks are taking, he added.

Reed warned that if banks do not make full use of the technology available today, they can suffer the fate

of the steel industry, which failed to keep pace with its international competition.

The operations manager must convince the bank that it must move from being strictly transaction-oriented, Reed said.

He noted that the move will be toward networking, interactive terminal-based computing and the paperless office.

The banking industry is "getting better and better" at training people such as tellers to make automation a reality. He cited as an example his own bank's introduction of automated teller machines, when Citibank renovated all branches and tried to make it clear that the employees and customers knew the bank was committed to the cash machines.

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## NEWS

# Four arraigned on charges of accessing Telemail

By Bryan Wilkins  
CW Washington Bureau

ALEXANDRIA, Va. — The U.S. attorney for the Eastern District of Virginia reported last week the arraignment of four individuals charged with illegally accessing the GTE Telemail system and penetrating the accounts of major U.S. corporations and the U.S. government.

One of the defendants indicated he will enter a guilty plea on three charges of wire fraud. The other three pleaded not guilty.

U.S. Attorney Lawrence Leiser said the indictments, handed down here May 7, "essentially allege" that the four entered the Telenet system without authorization, accessed customers' accounts, set up bulletin boards and arranged for the expenses they incurred to be charged to the accounts and to Telenet.

Among the companies whose accounts were penetrated were 3M Corp., the Coca-Cola Co., Raytheon Corp., Rada Corp., American Hospital Supply Corp., the National Aeronautics and Space Administration and

the U.S. Department of Agriculture, Leiser said.

The four individuals named in the indictments are William Landreth, 19, Poway, Calif., charged with three counts of wire fraud; Frederick Crouter, 46, Council Bluffs, Iowa, charged with five counts of wire fraud; Patrick Towson, 42, Chicago, charged with five counts of wire fraud; and Eric Corley, 27, Selden, N.Y., charged with 10 counts of wire fraud.

Attorney Leiser said that Landreth's attorney has indicated his cli-

ent intends to plead guilty. A June 19 trial date has been set for Towson; Corley's trial date is June 20; and Crouter's trial date is July 2.

Leiser said that each count carries a maximum five-year prison term and/or a \$1,000 fine.

While the indictments allege no conspiracy among the four, Leiser said, it appears that they were familiar, in some instances, with each other. In addition, eight juveniles and four adults were named in a misdemeanor citation accompanying the indictments, Leiser said.

## GTE announces encryption software to protect Telemail users

WASHINGTON, D.C. — GTE Telenet Communications Corp. last week announced for its public Telemail system a data encryption software package that is priced under \$600 and reportedly will guard against data base intrusions by hackers.

The Phasor Code Encryption System will make it more difficult to access the Telemail system fraudulently, company officials said here. The package, a commercial application of the National Bureau of Standards' Data Encryption Standard, was developed by International Phasor Telecom Ltd. and will be available within 60 days. It will initially run only on IBM and IBM-compatible equipment.

Telenet said that the package is different from

other security systems because it uses a public key system. Two distinct keys are used to encrypt and decrypt data. The public key is used to encrypt data before transmission, and the private key is a proprietary secret of the recipient required for the necessary decryption of the data.

To send an encrypted message via Telemail, the sender looks up the recipient's public key in a directory and enters it on his terminal, which will scramble the data. The recipient must then use his private encryption key to descramble the data into a usable format.

"There is no foolproof security system, but Phasor Code employs a complex mathematical code that makes it nearly impossible to intercept

messages from the system," said Joseph Porfeli, vice-president and general manager for Telenet's Network Applications and Terminals business unit.

GTE Telenet President J. David Hann told a press conference last week, when the encryption package was unveiled, that the extent of computer-assisted crime in the U.S. is hard to measure, but that statistics published by the Justice Department indicate the average computer-aided crime runs between \$200,000 and \$500,000 per offense.

He did not reveal the extent of monetary damages incurred by Telenet that resulted in the indictments of four individuals charged with accessing Telemail (see story above).

### DBASE from page 1

mailing labels.

Ashton-Tate will continue to sell Dbase II, the price of which it lowered by \$200 to \$495. Between June 15 and July 31, Dbase II customers can upgrade to Dbase III (or the multiuser version of Dbase II, announced in February) for \$200.

A conversion utility within Dbase III allows the new DBMS to read Dbase II files, Ashton-Tate said. Dbase III also will accept files from the multiuser version of Dbase II and exchange files with the vendor's forthcoming Framework integrated package.

In addition, a one-word command permits users to shift back to the op-

erating system to bring up other application programs, the company said. In this way, "any number of programs that run in PC-DOS can be run within Dbase III," Wayne Ratliff, Ashton-Tate's vice-president of new technology, said.

Dbase III runs on an IBM Personal Computer, Personal Computer XT or compatible machine with 256K bytes of random-access memory, IBM's PC-DOS 2.0 and either two floppy disk drives or one floppy disk drive and one hard disk drive. A separate on-disk tutorial will retail for \$9.95.

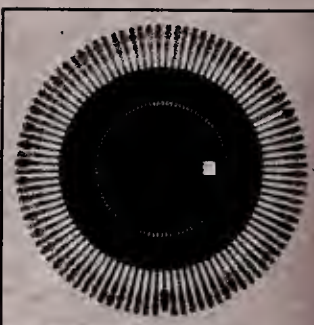
Dbase III will be available next month for \$695 from Ashton-Tate.

The firm is located at 10510 W. Jefferson Blvd., Culver City, Calif. 90230.

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## NEWS



Jack Crawford (center), assistant vice-president of information management systems, reviews a booth at The Hartford Insurance Group's recent Systems Productivity Fair.



Members of the Systems Productivity Support Division staffed the reference booth at the Systems Productivity Fair.



Organizers of the fair were (left to right) Stan Nickerson, William Baldwin, William Pastyrnak and Joseph Frascatore.

## Productivity fair acquaints programmers with tools

By John Gallant  
CW Staff

HARTFORD, Conn. — The Systems Productivity Support Division (SPSD) of the Hartford Insurance Group held a fair here this month — complete with balloons and free T-shirts — aimed at spreading the gospel of increased programmer productivity.

On the top floor of the Hartford's Tower Building overlooking the city, SPSP staff members staged an audiovisual extravaganza and manned a variety of booths highlighting the tools the group promotes for enhancing the efficiency of the insurance giant's nearly 2,000 DP workers. The first Systems Productivity Fair gave employees an opportunity to spend some time away from their terminals,

learning about the latest in productivity products and techniques.

DP management at the Hartford has made increased programmer productivity a "commandment" [CW, June 27], and SPSP is central to the achievement of that goal. SPSP's staff, which has grown to nearly 45, acts as a central resource for information and research on productivity tools and for support in their use.

### Foster wider use of resource

The Systems Productivity Fair is one method the group is using to foster wider use of that resource. "We wanted to get our products and our ideas out to everyone in the information management systems area," William Baldwin, assistant director of SPSP, said. "[The] Hartford's efforts

in the productivity area have been under way since about 1980, but some programmers were unaware of what we had to offer. This gets us wider exposure — and it also draws feedback from the users. We've picked up some really good ideas."

Based on the group's statistical research, SPSP assistant manager William Pastyrnak said the Hartford's application programmers have achieved the equivalent of an additional 190 man-years of work with-

out increased staff since use of the productivity tools began. The Hartford's structured testing methodology, which includes a mandatory "group inspection" for most programs, has reduced test time by a minimum of two days for each day of inspection undertaken, he added.

That application test methodology, which involves several popular software testing packages, is one of three pillars on which SPSP bases its

See FAIR page 22

## Show attendees get inside look at Developer Workstation

HARTFORD, Conn. — Visitors to the recent Systems Productivity Fair were given an inside look at the Hartford Insurance Group's Developer Workstation, currently being utilized on a pilot basis by 20 applications programmers within the insurer's data processing department.

The Developer Workstation project was undertaken to provide programmers with a multifunction workstation for performing analytical, managerial and DP tasks and ac-

cessing IBM test environments on mainframe processors [CW, June 27]. When the system is fully developed, the Hartford hopes it will allow users to transmit electronically documentation and system specs and automate many of the manual tasks involved in systems development.

During Phase I, a project team within the Information Management Systems Division selected the initial hardware and software components

See SHOW page 22

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## NEWS

# Query language shows potential to extend user base



**CW AT  
MPG ROUNDTABLE**

By Paul Gillin  
CW Staff

LOS ANGELES — A beta test site user of Mathematica Products Group, Inc.'s (MPG) Ramis II English natural query language said the product has provided a marked benefit to non-technical end users in his company. But he cautioned that a product such as English should be installed with clear goals in mind and that some specific training is necessary.

Speaking at MPG's Roundtable users group conference, held here recently, Bruce Barton of Southern Pacific Transportation Co. in San Francisco said English had successfully filled most user requests without causing frustration or noticeably affecting response times.

Southern Pacific installed English last December in a pilot project that involved a small number of users doing a shipping analysis of several

products carried by Southern Pacific. Few of the analysts were computer-literate, although most were accustomed to working with DP to obtain reports, Barton said.

The analysts now use English primarily to access data bases containing car movement and cost information for various products. It has allowed them to get immediate feedback without having to deal with DP and has provided satisfactory reports in four out of five cases, Barton said.

Barton outlined a number of factors that were key to getting users productive on the system. Management support was crucial "to get the time needed for analysts to become familiar with the new product." The DP department also conducted surveys and interviews with users to build the data base.

"If they don't have the information they need, they won't use it," Barton said. "The types of requests entered will dictate the hierarchical structure of the data base, which will directly affect search time."



CW Photo by P. Gillin

Barton

An optional, but useful, step is to build a file-specific dictionary that lays out the terms that will commonly be used to query the data base and translates them into Ramis II queries. "The predominant types of requests should influence what goes into the [dictionary]," he said.

The file-specific dictionary used in the pilot project contains 38 synonyms and 19 fields in nine semantic categories and took less than two hours to build. It has virtually eliminated the need for users to know field definitions, he said. Despite some vendor claims to the contrary, some degree of user training is needed to make users productive, Barton maintained. It is important that users know the basic structure of the data base so that they format queries properly. "The structure becomes important in very large data bases, as the searches against the entire data base can degrade performance," Barton said.

Training for the pilot project covered English logon procedures, which

are somewhat involved, and included a short class that covered guidelines on how to enter requests. Sample queries and hands-on experience with the help of DP were also provided. Moreover, the DP department monitored English logs periodically to determine any problem areas.

The pilot study involved five users on a prerelease version of English. An analysis of 242 requests showed that 65% of the queries generated the correct output, while 14% generated the correct information, but the wrong format. Of the 21% of the queries that produced incorrect output, most problems were traced to problems that were corrected in the production release, Barton noted.

In all, Barton said, the short-term benefits of English have included increased access to information and somewhat reduced training costs. In addition, users seem more enthusiastic about the potential of computers.

In the long term, he said, the DP department hopes to reduce its backlog of programming requests and to address some of the computerphobic problems of its end users.

## Large shop finds fourth-generation language meets programmers' needs

By Paul Gillin  
CW Staff

LOS ANGELES — Although it still cannot compete with Cobol in very large-scale processing environments, Ramis II, the fourth-generation language and data base management system from Mathematica Products Group, Inc. (MPG), has been found to satisfy 95% of all programmers' needs in one large shop.

Naston Manley, a technical consultant in Cities Service Oil and Gas Corp.'s MIS department in Tulsa, Okla., told a session at MPG's Roundtable users group meeting here recently that his multiple-mainframe installation has used Ramis II to produce many applications in as little as 10% of the time estimated for Cobol.

Ramis was brought into Cities Service originally as an inquiry tool, but users began building "some very so-

phisticated applications" — a situation that prompted interest from backlog-ridden MIS, Manley said. Soon, programmers began using Ramis II for screen design and data extraction.

The turning point for Cities Service came when an IBM IMS-based crude oil accounting application began to run overtime and over its \$3.5 million budget. The department discovered that Ramis II could virtually replace Cobol for that application.

Two programmers, neither of whom knew Ramis II or IMS, were able to turn out two to three reports a day. They finished the job in about 600 hours, compared with an original budget of 6,000 hours, Manley said.

In another instance, Ramis II was successfully used to produce in two days an IMS application that had been budgeted for six to eight weeks.

"The programmers were happy, and the user was elated," Manley said. "As a result, that whole part of the DP department became Ramis users."

Manley noted that languages like Ramis II can be particularly useful in speeding system development by cutting code production by up to 90%. Prototyping "becomes a real tool, where in the past it was prohibitive due to cost." File structures can often be changed in minutes, and documentation of all coding is produced as a by-product of system development.

Manley said Ramis II appears to meet 95% of reporting and 99% of data extraction and reformatting requirements in his shop. With MPG's Relate facility for Ramis II, nearly all file-matching activities can also be handled, he said.

But the speaker said the tool is still meeting with some resistance at Cities Service. While young programmers have been receptive, experienced programmers and managers are holding back on its use.

"We haven't yet reached the stage where we start [a project] by using Ramis," Manley said. "Some programmers won't use it because they

think they can do the same thing with Cobol skeletons. But they find they can do in 10 minutes with Ramis what takes an hour with Cobol skeletons."

However, Manley conceded that Ramis II has limitations for production-scale processing. Although concurrent update ability is slated for availability in the next release, that facility has not been offered in previous versions. Also, "Ramis does use a lot of CPU," Manley said.

But Manley said the trade-offs were acceptable in light of reduced programming costs. "Most users aren't upset [about the machine cost] if they can get the system up quickly. CPU cycles are one of the prices we pay for throughput," Manley pointed out that a Cobol program can require as much as 50% of its development cost for maintenance during its first 18 months.

To cope with Ramis' inefficiencies, Manley stressed the need to enforce efficient coding. He cited one Ramis II program that initially took nine hours to load. After making a few adjustments to the code, the program was reloaded in 15 minutes, he said.

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## NEWS

# Firm puts application development in end users' hands



CW AT  
MPG ROUNDTABLE

By Paul Gillin  
CW Staff

LOS ANGELES — Although its information center is technically separate from its DP center, Alcon Laboratories, Inc.'s application development philosophy could serve as a model for many information centers. In the last four years, Alcon has virtually eliminated new development in Cobol. Instead, it has installed packaged applications and farmed out a lot of new development to end users.

The Fort Worth, Texas-based Alcon, which is the world's largest producer of eye care pharmaceuticals, underwent a radical change of direction when a new vice-president of management information systems came four years ago.

"Our management is fully committed to fifth-generation techniques,"

said Kathlyn Bice, a trainer in the information technology group. "We're moving almost full control to users."

The core of the development process is now Ramis II, a high-level language and data base management system from Mathematica Products Group, Inc. (MPG) of Princeton, N.J. Ninety-one people, or about 20% of Alcon's potential end-user audience, now use Ramis II at least once a month.

Interviewed at MPG's Roundtable users group meeting, held here earlier this month, Bice explained that users have taken to the idea of being responsible for their own applications. Trainers can't keep up with demand, and, in some cases, "users have become more knowledgeable in Ramis than the information technology department," she said.

Alcon uses five business systems managers who come from the user community and serve as the first line of communication between the users and data processing. The information technology department will not develop applications unless specifically

requested to do so by the users. In those cases, the job is charged back to the user departments.

Ramis is used at Alcon as the front-end data base management system from which users extract data for their applications, Bice said. However, IBM Vsam files are still the primary data storage vehicle. Bice noted that until recently, Ramis II's lack of concurrency facilities prevented the data base from being updated on-line. That will probably change now that MPG has added maintenance features to its latest release of the product, she said.

The user-oriented philosophy has met with little resistance from the DP department, Bice noted. Cobol is still being used to maintain old software, but enhancements have been virtually eliminated.

"The user either lives with what he's got or goes with a packaged product, which we hope he'll do," she said. Alcon recently installed accounts payable and accounts receivable packages from McCormack & Dodge Corp. and a payroll package

from Management Science America, Inc. It is also planning to install a general Wedger package soon. Users have "complete responsibility for running the packaged applications," she said.

In some cases, users have written applications consisting of more than 1,000 lines of Ramis code. There have been some problems with data integrity, but that issue has been successfully handled by keeping production data in Vsam files, which are maintained by the DP department. Business systems managers are responsible for maintaining file integrity, and data base access is protected by IBM's Resource Access Control Facility security product.

Since the new procedures were installed, the character of DP has changed at Alcon. "We like not having to do new development any more," Bice said. "The DP department seems willing to welcome the users." DP activities are now restricted primarily to answering questions, administering the data base and performing maintenance.

## DP groups warned to prepare for advance of information centers



CW AT  
MPG ROUNDTABLE

By Paul Gillin  
CW Staff

LOS ANGELES — The proliferation of information centers presents both opportunities and risks for data processing. And since the information center is here to stay, DP should start preparing to deal with the consequences.

Speaking at Mathematica Products Group, Inc.'s recent Roundtable users group meeting here, Vaughan Merlyn, president of the Atlanta-based Merlyn Corp. consulting firm, outlined what he sees as some of the changes that the information center will bring about.

User-driven computing will result in higher productivity and will reduce the amount of "information float," in which data becomes lost in the paper shuffle between departments, Merlyn said. Other benefits

will include improved communication among users and between users and the DP department.

In addition, Merlyn said, data base quality will improve as the data base is exercised more actively. Also, better computer systems will result because users will take more of an interest in the quality of those resources, he said.

End-user computing also presents the DP department with the opportunity to offload more of the burden of change to users. "Everyone will be using the system, so users can do much more of the development and maintenance work," Merlyn said.

However, this evolution also presents hazards, Merlyn warned. The spiraling cost of information will quicken as users demand more resources. To prove his point that information centers increase costs, Merlyn pointed to IBM's estimate that it has sold 10,000 4300 series machines because of information centers alone.

The DP department will have to spend more money on training and

internal consulting, Merlyn said.

He called the trend toward reductions in DP training budgets "fright-

ening" and urged attendees to start looking outside their own departments. See MERLYN page 22



Merlyn  
CW photo by P. Gillin

## DP urged to distribute functions

LOS ANGELES — Just because your company has successfully implemented an information center doesn't mean you should breathe a sigh of relief. In fact, this evolving concept will probably make life more difficult for DP until new procedures are installed.

Those were among the comments of Vaughan Merlyn, president of the Atlanta-based Merlyn Corp. consulting firm, who spoke at Mathematica Products Group, Inc.'s recent Roundtable users group meeting here.

Merlyn observed that most suc-

cessful information centers have actually spawned an increase in DP application backlogs because, as users become more computer-literate, they begin to demand more from DP, he said. In addition, increased end-user computing is likely to accelerate hardware requirements and require more careful control of a DP structure that will expand faster than ever before, Merlyn said.

Improving its own productivity is one of the most important measures that DP must take, according to Merlyn. See BACKLOG page 22

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Employee Number: 109649  
Employee Name: Ms. Margaret Wells  
Department: Marketing  
Birthdate: 04SEP57  
Sex: F  
Location: Bldg A  
Work Phone: 4938  
Number of Dependents: 0  
Marital Status: S  
Social Security Number: 242-23-3943

Home address: Apartment B  
4905 Dana Drive  
San Jose, CA 95126  
Home phone: 555-7654

Information about Employee's Spouse:  
Spouse's Name: N/A  
Spouse's Employer: N/A  
Work Phone: N/A

In Case of Emergency:  
Name: Mr. or Mrs. R. W. Wells  
Address: 205 Trail in the Pines  
Wilmington, NC 28402  
Relationship: Parents  
Emergency phone: 919/555-1234

Emergency Information:  
Type: Carrier  
Life: Blue Cross Blue Shield  
Medical: Blue Cross Blue Shield  
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Thank you for helping us keep our files current.

Sincerely,  
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San Jose, CA 95128  
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Command ##) Edit SAS data set: EMP.INFO

Employee Information

Employee Number: 109649  
Employee Name: Ms. Margaret Wells  
Department: Marketing  
Birthdate: 04SEP57  
Sex: F  
Location: Bldg A  
Work Phone: 4938  
Number of Dependents: 0  
Marital Status: S  
Social Security Number: 242-23-3943

Home address: Apartment B  
4905 Dana Drive  
San Jose, CA 95126  
Home phone: 555-7654

Information about Employee's Spouse:  
Spouse's Name: N/A  
Spouse's Employer: N/A  
Work Phone: N/A

In Case of Emergency:  
Name: Mr. or Mrs. R. W. Wells  
Address: 205 Trail in the Pines  
Wilmington, NC 28402  
Relationship: Parents  
Emergency phone: 919/555-1234

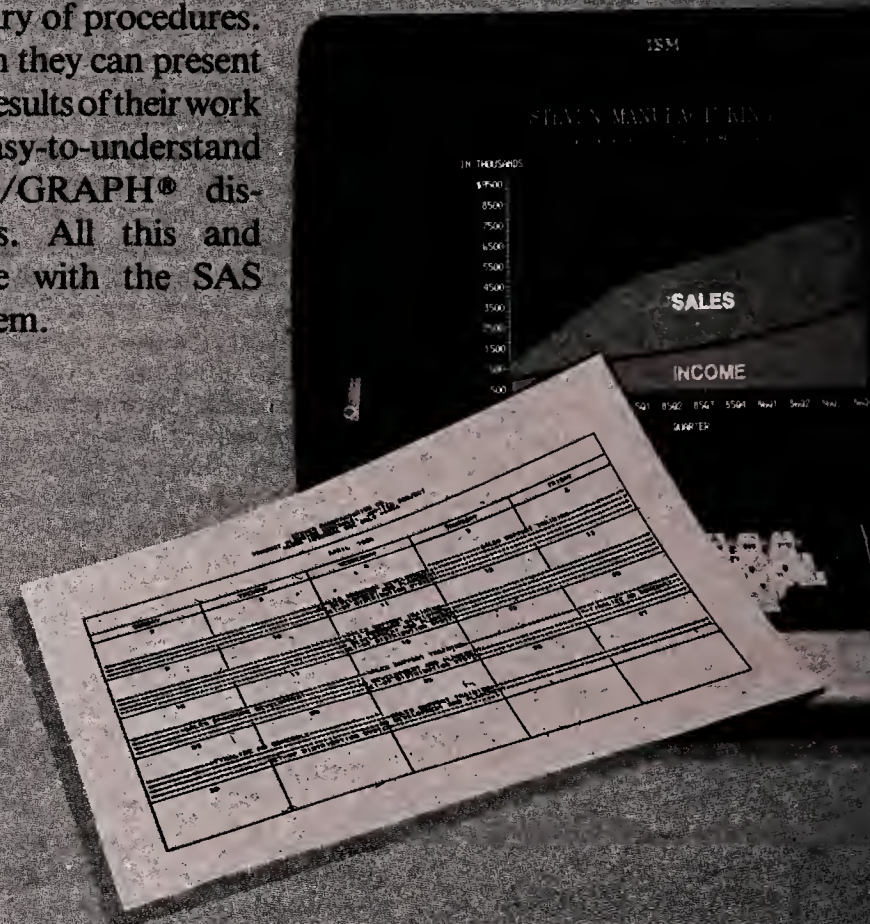
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| Category       | Value     |
|----------------|-----------|
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| Development    | 3,000,000 |
| Marketing      | 1,500,000 |
| Administrative | 2,000,000 |
| Other          | 1,000,000 |
| Total          | 9,200,000 |

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|---|----------|-------------------------|---------|-------|-----------|-------|
| DEPARTMENT  | JOBNAME  | CPU MINUTE              |         |       | I/O COUNT |       |
|   |          | NUMBER OF<br>EXECUTIONS | SUM     | MEAN  | SUM       | MEAN  |
| ACCOUNTING  | JACCT110 | 3                       | 31.32   | 10.44 | 11372     | 3791  |
|   | JACCT110 | 7                       | 36.87   | 5.37  | 34966     | 4995  |
|   | JACCT320 | 6                       | 103.95  | 12.99 | 76237     | 9580  |
|   | OTHERS   | 25                      | 112.76  | 4.55  | 56085     | 2283  |
| HUMAN RESOURCES   | OTHERS   | 18                      | 31.00   | 1.72  | 50318     | 2795  |
| LEGAL   | OTHERS   | 16                      | 17.00   | 1.06  | 8218      | 514   |
| MARKETING   | JMKT0170 | 3                       | 31.35   | 10.45 | 13557     | 4519  |
|   | JMKT0200 | 9                       | 105.34  | 16.15 | 159131    | 17681 |
|   | JMKT0215 | 8                       | 82.33   | 10.29 | 83748     | 5469  |
|   | JMKT0220 | 7                       | 67.01   | 9.57  | 12357     | 1808  |
|   | OTHERS   | 21                      | 69.95   | 3.28  | 100880    | 4804  |
|   | OTHERS   | 17                      | 52.00   | 2.53  | 27479     | 1616  |
| PLANNING  | OTHERS   | 12                      | 80.47   | 6.71  | 107271    | 8939  |
| PRODUCTION  | JPROD090 | 7                       | 170.00  | 24.29 | 89020     | 12717 |
|   | JPROD050 | 4                       | 56.35   | 14.39 | 91561     | 22890 |
|   | OTHERS   | 24                      | 142.18  | 5.92  | 106152    | 4415  |
|   | OTHERS   | 4                       | 56.87   | 9.42  | 22719     | 5630  |
| SYSTEMS   | JSYS005  | 4                       | 26.02   | 6.15  | 39212     | 9803  |
|   | JSYS700  | 4                       | 67.34   | 11.84 | 61780     | 10445 |
|   | JSYS050  | 6                       | 68.47   | 12.42 | 80254     | 10044 |
|   | OTHERS   | 17                      | 92.88   | 1.99  | 118291    | 6723  |
|   | ALL JOBS | 222                     | 1840.00 | 6.49  | 1246608   | 6154  |

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## NEWS

**MERLYN** from page 19

ments for educators.

**Tool familiarity**

"Once a user gets to know a tool, he doesn't want it taken away in the name of standardization," he said.

Organizations will polarize between computer literates and computer illiterates, leading to increased conflict over technologies and ownership of data. "I think some information centers are a security disaster waiting to happen," he said.

The best way to avoid these problems, Meryln said, is to standardize early. Companies should also develop a plan that prevents technologies from multiplying throughout the information center, development center and production environments.

**BACKLOG** from page 19

lyn. Citing the industry's continued reliance on Cobol, he said, "There's one bastion of technology today that's absolutely uncomputerized, and that's DP."

Merlyn strongly urged his audience to install a formal application development center to assist programmers in their work. In addition, DP strategies need to be more closely coordinated with information center, office automation and other strategies "to avoid multiple technologies," he said.

DP managers should accept the inevitability of end-user computing and try to exploit that opportunity, Merlyn recommended. "We're going to a decentralized, end-user controlled processing organization," he

stated. "The organization of the future will have information center consultants as part of user departments, and we have to start planning for that."

DP departments should establish "points of control" for major functions, such as network management, data base management and personal computers, Merlyn advised. Information resource management should sit at the top of the pyramid with other control points stationed in areas that are unique to the organization.

The DP department should also overcome its fear of multiple technologies by standardizing on functional models rather than languages, he said. That way, a Cobol application can be redeveloped in a fourth-generation language without sacrificing capabilities.

**FAIR** from page 17

productivity efforts. The others are high-level programming languages, such as Information Builders, Inc.'s Focus fourth-generation language and reusable code.

Information on each of the three areas was on display at the Systems Productivity Fair. Programmers could learn, for example, how high-level languages are being utilized within the Hartford to facilitate ad hoc reporting, perform data analysis and prototype end-user applications.

Instruction was also available in the use of IBM's Storage and Information Retrieval System (Stairs) indexing facility to access "canned" portions of reusable code. Under Stairs, SPSP has cataloged a variety of common modules, logic structures, program skeletons, IBM's CMS Execs, CMS macros and working code generators that programmers can utilize during the coding phase of an application development project.

SPSP staff members also pitched the group's Reference Center, which gives programmers access through Stairs to DP and business periodicals, reference works, technical manuals and a variety of other information sources. The Reference Center can also provide access to outside data bases such as Dialog Information Services, Inc.'s Dialog information retrieval system.

Other projects in place at the Hartford were also on display at the fair, including a pilot telecommuting program designed to allow some programmers to work at home and an applications maintenance center project developed recently to address systems maintenance problems.

In addition, programmers were given an update on the Hartford's Developer Workstation project (see accompanying story), which is aimed at providing each employee with a microcomputer-based integrated environment for applications development.

**SHOW** from page 17

for the workstation. It currently consists of a Wang Laboratories, Inc. Professional microcomputer, a Wang 2200 VS100 minicomputer and facilities for communication to the IBM test environments via 3270 terminal emulation.

**VS emulation**

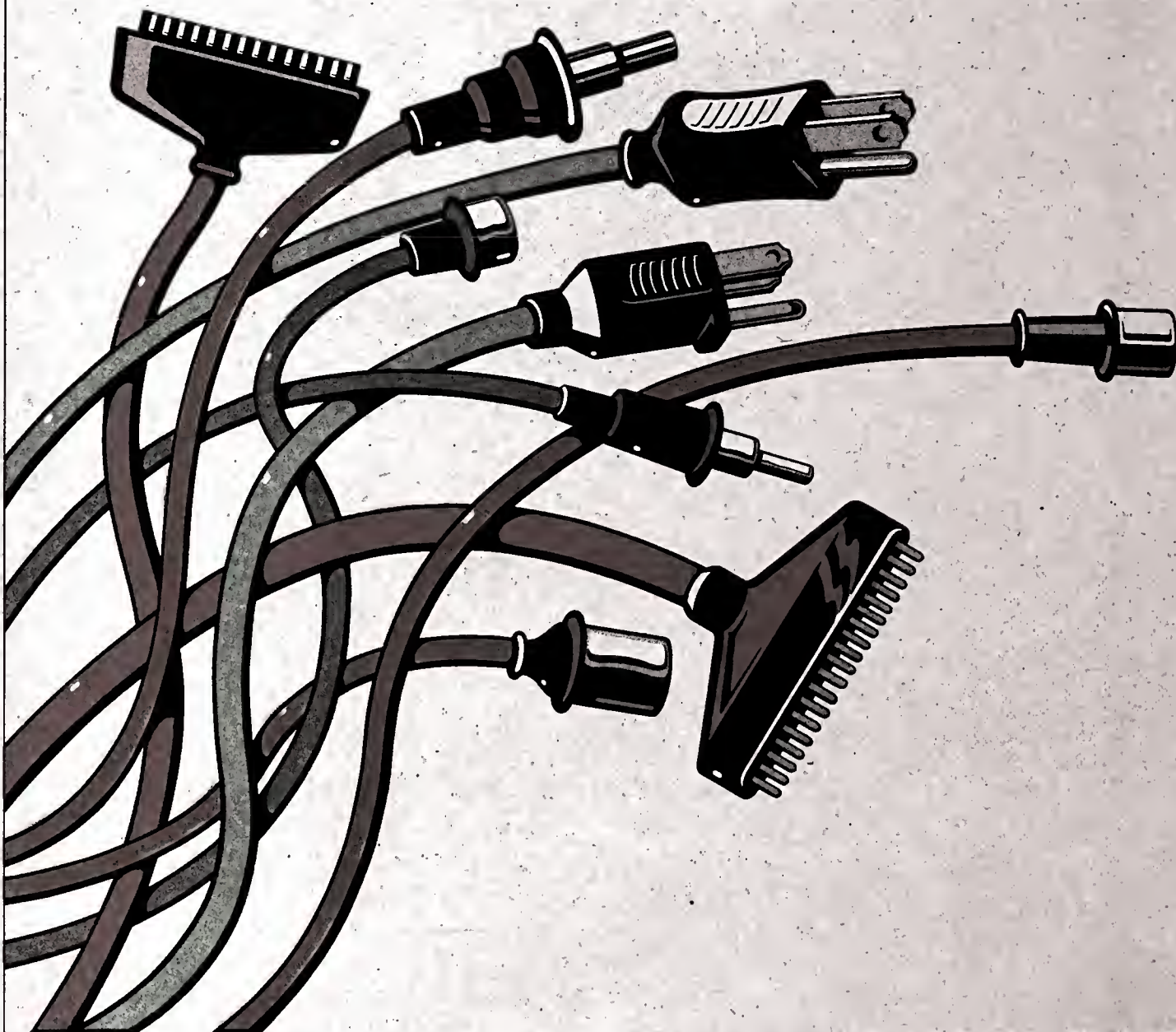
VS emulation software on the micro allows it to act as a Wang VS workstation and utilize the disk storage capabilities of the mini.

In addition to this, IBM emulation software on the minicomputer allows access to either CMS or TSO via 3270 communications.

The project team plans to provide connections to IBM's CICS and Virtual Terminal System sometime in the future.

The Developer Workstation also comes equipped with microcomputer software packages, such as Lotus Development Corp.'s, 1-2-3, and the minicomputer offers software for office automation functions, software development as well as other applications.

Phase II of the Developer Workstation project, now under way, involves the evaluation of software that may allow the offloading of some Cobol programming tasks to the micro.

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## NEWS

# Client data vulnerable in law firms' move on-line

By Edward Warner  
CW Staff

Large law firms across the U.S. are moving to on-line storage of their often massive client files, a move some experts say is leaving those files vulnerable to disgruntled or avaricious employees with a knowledge of computing.

The issue was highlighted recently by the case of Steven M. Crow, a word processing employee of a New York law firm who allegedly broke into his firm's computerized client files to gain access to confidential merger and acquisition plans. Crow, who pleaded guilty recently to a federal charge of conspiracy to commit securities and mail fraud, allegedly provided the inside information to several stockbrokers in exchange for a portion of the profits to be made in trading the stocks of the law firm's clients.

Crow used the law firm's word processing system to access the computerized files; he then broke the encryption scheme that had protected the files and used the dollar sign symbol to scan the files for cases that mentioned sums of money, according to Andrew J. Levander, the U.S. at-

*Law firms leave themselves open to suits from their own clients should someone gain access to and disseminate information from a law firm's files.*

torney prosecuting the case.

No one at Skadden Arps Slate Meagher & Flom, the law firm where Crow worked, would discuss the case. However, Stephen Leibholz, president of Analytics, Inc., a computer file security system firm in Willow Grove, Pa., suggested that Skadden Arps' file-encryption scheme may have been based solely on software. If so, he said, the encryption scheme was stored in the computer's memory, waiting to be broken.

A break-in to the law firm's computer files would have been less likely, Leibholz claimed, had Skadden Arps been using an encryption system based on hardware and software.

Unauthorized file access presents a special problem for law firms, Leibholz said, because "the most important thing a law firm has is its data

and its confidentiality."

An attorney who asked not to be named said the Skadden Arps case "raises the ante. What was just a possibility before is now a reality." He warned that law firms leave themselves open to suits from their own clients, should someone gain access to and disseminate information from a law firm's files.

If such a suit were undertaken, it is unlikely that a law firm would be insured against losses from it, according to Marr Haack, product manager for St. Paul Fire and Marine Insurance Co., a Minnesota insurance company that offers insurance for disaster-related data file losses. "There is a lot of concern about that particular risk," Haack said, but his company and most others do not offer coverage for it.

Besides being open to theft of information, a law firm's computerized files can also become the target of a disgruntled employee, noted Betsy Turner, the chairwoman of the Computer Committee of the American Bar Association's Economics Section. Turner said she knows firsthand of a situation in which a law office's DP

manager purposefully "messed up about 10 programs" after being offered a job in another city.

"If [employees] have the knowledge, they can do it with no trouble," said Turner, a member of a firm with 150 employees and five branch offices.

The issue of computer file security, argued Boston attorney Foster Cooperstein, who practices computer law among other specialties.

time you have information that should be confidential, you're dealing with trust in employees," said Cooperstein, who practices computer law, among other specialties.

That assessment was echoed by Jay Westcott, a senior partner in the 200-lawyer Boston firm of Hale and Dorr, where a computer system incorporating electronic mail, word processing and billing is being implemented. "There's no system that can protect you if there's dishonesty," he said. Hale and Dorr, at least for the present, will not be putting its client files on the computer, he added.

Analytics' Leibholz, meanwhile, advised law firms moving to on-line filing systems to choose a security system that incorporates three levels of protection: encryption of transmitted data using a hardware scrambler; encryption of data files using a combination of hardware and software; and authentication, the use of passwords. Such a system, he said, would cost about \$1,000 per terminal.

## Large law firms moving toward automated office

By Edward Warner  
CW Staff

The 200-attorney law firm of Hale and Dorr is getting into office automation in a big way. Three hundred terminals linked to several minicomputers will serve the Boston firm's word and data processing needs by the end of the summer.

Hale and Dorr's move to computerization mirrors the start of a trend among law firms of similar size across the U.S., according to Phil J. Shuey, an adviser on computers to his fellow American Bar Association (ABA) members. Shuey said approximately 400 law firms sent representatives to an ABA conference on law office computing in San Francisco early this year.

Shuey admitted, though, that most firms have yet to fully integrate the computer into their offices. Only 30% to 40%, he said, even use word processing, and less than 10% use computers for accounting functions. But, he added, those firms that are involved with computing "are becoming much more aggressive about it."

Beyond its standard uses in word processing, Shuey said, a computer in a law office offers access to on-line legal libraries such as West Publishing Co.'s Westlaw and Mead Data Corp.'s Lexis, electronic mail and even airline ticket and flight information, available on the ABA's Abanet network.

The ABA established its Computer Committee in 1974 to provide information to attorneys who are considering a computer purchase and to organize users groups. Shuey, the committee's vice-chairman, said the committee's objective is "to get lawyers to use their computers as win-

dows on the world."

For that reason, Shuey urges law firms to get communications capability when they purchase a computer system, especially if their practice has several branch offices. A modem also permits an attorney to link with one of the several on-line legal libraries, most of which offer the decisions of the U.S. Court of Appeals, the Supreme Court, the U.S. Court of Claims and state appeals courts, among others. The Westlaw system, according to a West Publishing spokeswoman, also offers a feature called Insta-cite, which gives lawyers an update on how a particular case has been used as a precedent in subsequent cases.

Another legal reference service available via modem to law offices is the Ambar legal resource library of the ABA. The service, for ABA members only, provides for keyword search and retrieval of ABA research reports.

Hale and Dorr's computer implementation will provide electronic mail, billing information and data and word processing capability, according to one of its senior partners, Jay Westcott. Every Hale and Dorr secretary and several of its attorneys will have Computer Consoles, Inc. terminals on their desks, each linked in groups of 12 to 25 Computer Consoles Power 5/20 minicomputers running what Westcott called very good Unix-based office automation software.

The 12-terminal clusters will be linked in local-area networks, and the Power 5/20 minis will be connected with each other for data transfer as well. The firm will continue to rely on the Lexis data base for its legal research.

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## NEWS

# Manufacturing still automation holdout: study

Predicts small penetration of programmable automation through end of decade

By Jake Kirchner  
CW Washington Bureau

WASHINGTON, D.C. — Manufacturing industries will continue to be one of the last holdouts in the U.S. rush to automation, according to a recently released congressional study.

The congressional report predicts only a small penetration of programmable automation in this particular economic sector through the end of the decade.

According to the Office of Technology Assessment (OTA), a bipartisan Capitol Hill advisory agency, programmable automation technologies — computer-aided design, industrial robots, numerically controlled machine tools, flexible manufacturing systems and computer-integrated manufacturing — are

“in a relatively early stage of development and even earlier stages of applications.”

## Exacerbate problems

These technologies are “not likely to generate significant net national unemployment in the near term,” the OTA said, but added that their use “may exacerbate regional unemployment problems, especially in the East, North Central and Middle Atlantic areas where metalworking industries are concentrated.”

Although programmable automation can displace workers, resulting industrial modernization may so boost the economy that more jobs will be created, according to the OTA report.

Surveying a number of technologi-

cal, demographic and economic trends for the manufacturing sector, OTA predicted that programmable automation will cause the following “broad, long-term trends in occupations”:

■ Demand for engineers and computer scientists, technicians, mechanics, repairers and installers on the whole will rise — although certain occupations (for example, draftsmen) will face diminishing opportunities.

■ Demand for craftworkers (excluding mechanics), operatives and laborers — especially the least skilled doing the most routine work — will fall.

■ Demand for clerical personnel will fall.

■ Demand for upper level manag-

ers and technical sales and service personnel will rise, although lower management and middle-management opportunities among users of programmable automation may fall.

These trends will help fuel the nation's growing emphasis on education, training and retraining issues, according to the almost 500-page report.

In general, the report said, “a prerequisite of [programmable automation]-related instruction of all types is a strong foundation of basic skills — particularly reading, science and math.

“The high level of functional illiteracy in the U.S. population is a major barrier to development of [programmable automation]-related skills,” the report said.

## Major study to report on effects of government technology use

By Jake Kirchner  
CW Washington Bureau

WASHINGTON, D.C. — A major study of federal government use of information technology, emphasizing its effects on government administra-

tion and on civil liberties, has been initiated by Congress' Office of Technology Assessment (OTA).

OTA Project Director Fred Wood, who called the study “a major assessment,” said recently that the project

will last 15 months, with a final report due in the fall of 1985.

OTA has budgeted \$640,000 for the study, which Wood said will be “an applied study” that will examine possible uses of current technology in the next five years.

Titled “Federal Government Information Technology: Administrative Process and Civil Liberties,” the study will focus on four possible effects of computer and communications technology use in the government.

Those effects are:

■ Government administration — the effect of new technologies on how programs are administered and government services delivered. As an example, Wood suggested that one possible area of study under this topic would be the implications of widespread government use of teleconferencing, perhaps to allow citizens to speak directly to government officials.

■ Provision of government information — how new technologies change the ways in which information about the government or information generated by government agencies is provided to the public.

■ The impact on and implications for civil liberties of federal agency computer and telecommunications systems.

■ Possible alterations in the balance of power between the legislative and executive branches of government and the effect on the standing of the judiciary branch within the government.

Wood said that at least one congressional subcommittee is concerned that government agency use of these technologies may be beyond effective congressional oversight.

The wide-ranging nature of the study assignment reflects the relatively large number of committees supporting the study, according to Wood.

He said that although originally requested by one House and one Senate committee [CW, Aug. 29, 1983], the assessment has attracted “significant interest” from at least two more Senate committees and three House panels with varying jurisdic-

tions. Those jurisdictions include government operations, privacy, research and development, copyright and patents and congressional administration.

Wood also said that support for the study among members of the bipartisan House-Senate governing board of OTA “spanned the political spectrum.”

Wood attributed this to a rising concern about technology and civil liberties sparked by the year 1984.

## Change in climate

“I sense a change in the overall climate,” he said, adding that this year is “an appropriate time for OTA to do a study like this.”

Although various committees have looked at some of these issues over the years, this will be the first structured, broad-view study of government technology use, he said.

Wood called the assessment “a real opportunity for a substantial contribution in these areas.”

OTA is now putting together an advisory panel for the study, to number about 15 persons specializing in such fields as law, civil liberties, political science, government administration and applied technology, according to Wood, who said he hopes to have the panel meet for the first time by July.

Rather than investigate the effects of specific government systems, he said, the agency will take “a generic look” at government technology use and the possible effects of increased technology in government.

## Half-million micros

For example, he said that by 1990 there will be an estimated 500,000 microcomputers in federal use, spanning all agencies.

According to Wood, this has obvious implications for privacy and security.

While it is too early to suggest what the study will find, Wood said it is possible that federal agency technology use is so drastically changing the nature of government that Congress “might consider a fundamentally different approach” to federal oversight.

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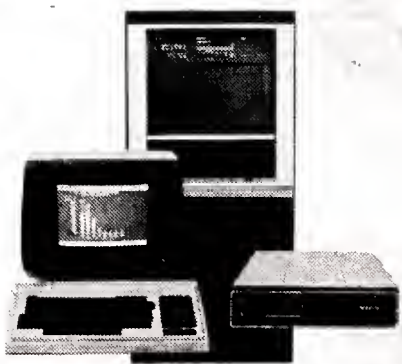
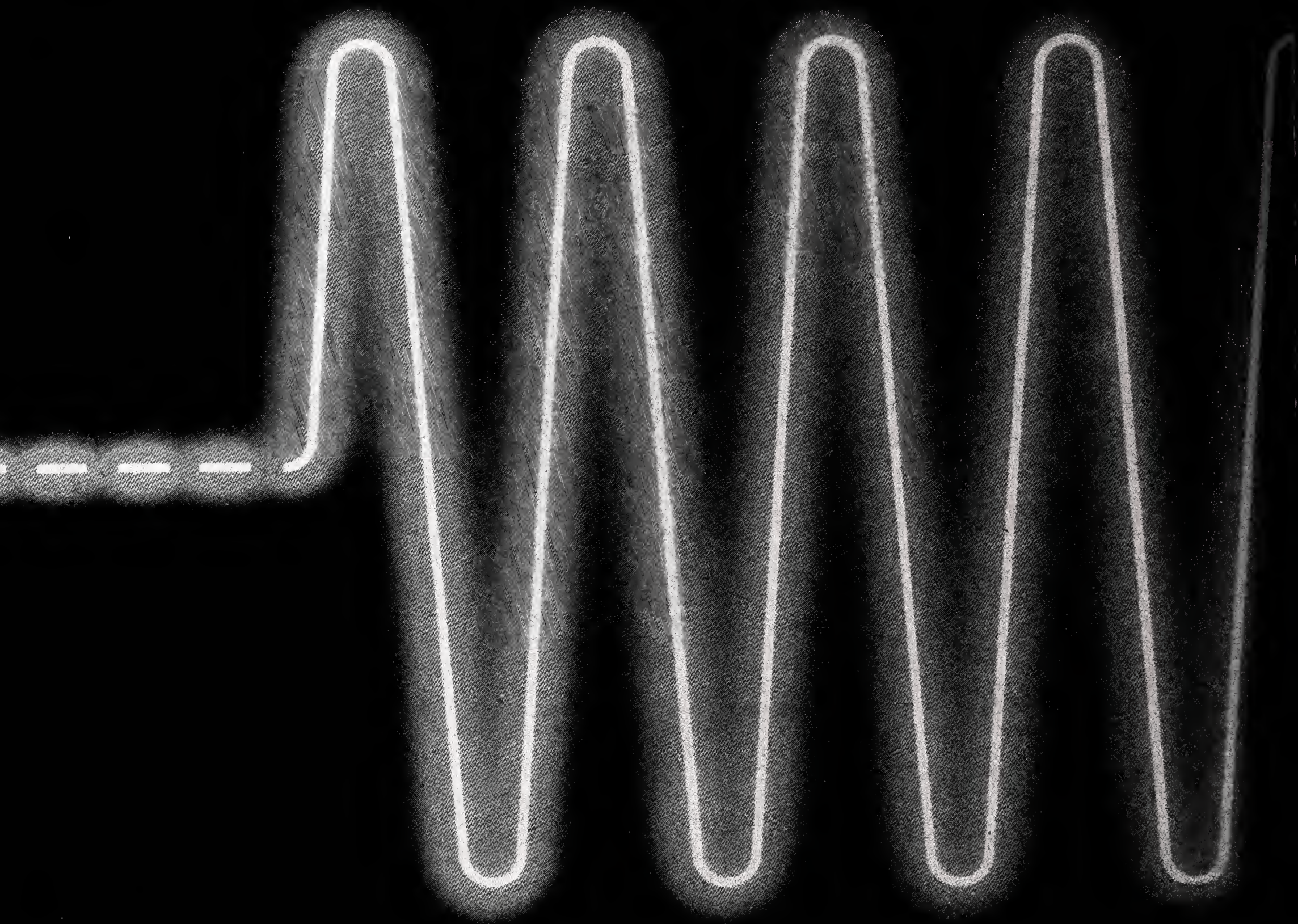
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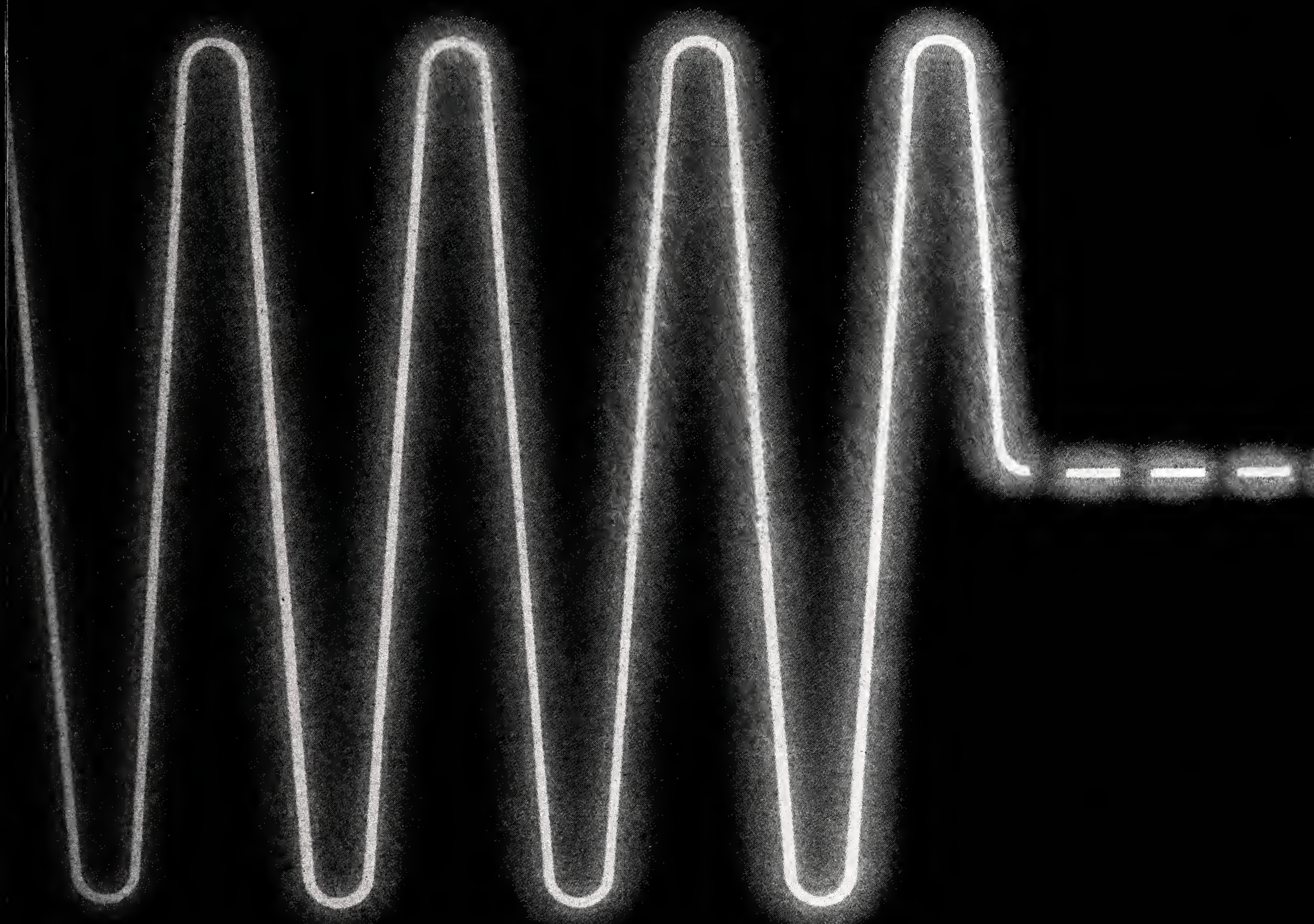
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## NEWS

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## AUSTRALIA

BRISBANE — A product that reportedly enables users to implement IBM's SQL/DS on most processors, including microcomputers, has been developed here by a group of

Australian and European data base engineers. Called Squirrel, the software is bit-by-bit source-compatible with IBM's fourth-generation relational data base management system, according to Prof. Shir Nijssen, chairman of Queensland Information Technology. Already implemented on an IBM Personal Computer XT, Squirrel requires less than 1M byte of random-access memory and at least 5M bytes of mass

storage, according to Nijssen.

## BRAZIL

RIO DE JANEIRO — The Brazilian Association of Computer and Peripheral Users will meet with Brazil's National Congress during the coming months to analyze Brazil's national "market reservation" policy, which was adopted in 1976 to prevent foreign computer mak-

ers from manufacturing or selling computers in Brazil. The association is expected to argue that the policy be institutionalized to ensure the successful development of a domestic computer industry in Brazil.

## JAPAN

TOKYO — Toshiba Ltd. has announced a 16-bit personal computer called Pasi-

pia 1600 to compete with the IBM Personal Computer here. Pasi-pia 1600 is available in three versions, ranging in memory capacity from 720K bytes to 10M bytes, and is based on Intel Corp.'s 8086-2 microprocessor and the Japanese version of the MS-DOS operating system. Priced from \$4,320 to \$5,840, the system performs Japanese character processing, data base access and manipulation, videotex and teletext.

TOKYO — The Institute for New Generation Computer Technology, in its effort to develop the fifth-generation computer, recently unveiled the Relational Data Base Machine (RDBM). Called the first step in the development of knowledge-based machines, the RDBM will provide a test environment for the study of knowledge-based functions and is also expected to provide an environment to develop software with a logic-type language connecting the inference system through a local-area network.

## SINGAPORE

SINGAPORE — The Bank of America is reported ready to invest more than \$90 million to set up a number of DP centers here and in Hong Kong. The centers will be part of a five-year \$175 million project to develop a sophisticated information processing network called the International Banking System. Verone Gibb, chief executive officer for the bank's Asia division, said the system will standardize DP procedures for Bank of America across geographic boundaries. The centers will be driven by two IBM 3083 mainframe computers; the Hong Kong center is expected to employ 250 people and will handle all data for the northern area of the bank's Asia division, including Taiwan, Japan and Korea, in addition to Hong Kong. The Singapore center reportedly will have a staff of 100 and will service the southern Asian region.

## UNITED KINGDOM

BRISTOL — The computer software division of RTZ Computer Services, Ltd. has been acquired by the American software company, McCormack & Dodge Corp. (M&D). Renamed M & D Ltd., the company will continue to provide marketing and support for users of M&D products throughout the UK and the Republic of Ireland. The company will also continue to support users of Digital Equipment Corp. PDP-11 software and financial planning services, according to M&D.

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## NEWS

# Credit card fraud bill incorporates DP crime provisions

## Moving faster than languishing federal computer crime bill

By Jake Kirchner  
CW Washington Bureau

WASHINGTON, D.C. — As the federal computer crime bill nears its seventh anniversary of congressional inaction, legislation with many of the same provisions is moving quietly but quickly under a different name through Congress.

The U.S. House of Representatives version of the legislation, primarily aimed at credit and debit card fraud, contains a section on fraud and abuse involving computers in federal service and interstate commerce. The bill was approved by the House Judiciary Subcommittee on Crime last Tuesday after being amended to beef up its computer crime provisions and make them more like those contained in the better known Federal Computer Systems Protection Act (H.R. 1092), now hung up in another subcommittee.

A Senate version of the credit card bill, which does not contain provisions relating to computer crime, passed the full Senate late last month.

### Sponsors confident

Sponsors of the House version, who include Rep. Bill Nelson (D-Fla.), main sponsor of H.R. 1092, said they are confident the computer crime amendments will survive final deliberations on the credit card bills and be enacted by both houses by the end of this year.

The bill, titled the Counterfeit Access Device and Computer Fraud and Abuse Act of 1984, still faces significant barriers to passage, particularly the belief among several key legislators in the House and Senate that it would unnecessarily extend the jurisdiction of federal law enforcement authorities.

But one House staff attorney working on the bill said the legislation would allow Congress to adopt a "get-tough" approach to crime during an election year and said a growing congressional perception that some action is needed against growing credit card fraud will help ensure passage of the bill.

The staffer predicted speedy approval by the full House Judiciary Committee and then the House itself. "A bill of some sort will pass both houses this year," he added. He and a Senate staff member working on computer crime legislation predicted the Senate will accept inclusion of the computer crime section of the legislation.

### Categories of misdemeanors

The bill, as it emerged from subcommittee last week, creates several categories of misdemeanors and felo-

nies for various acts of accessing a computer without authorization, using that access to obtain classified information, money, goods or services without authorization or to obtain, modify or disclose information or prevent authorized use of the computer.

The bill would cover federal systems or those used in interstate or foreign commerce, which would cover any system accessed by way of most telecommunications systems. The bill would also punish anyone conspiring to commit such crimes. A range of fines and prison terms is provided for the various offenses under the legislation.

The legislation has received endorsement from a number of groups within the DP community, including the Data Processing Management Association and the EDP Auditors Association.

# Georgia's automated public assistance program hits some snags

By Paul Korzeniowski  
CW Staff

ATLANTA — Some food stamp recipients were issued duplicate benefits, and others had to wait four weeks for their cases to be processed after the Division of Family and Child Services in the Georgia Department of Human Resources automated its principally manual public assistance program.

The delays came to light in a review of the Georgia Public Assistance Reporting and Information System (Paris) that was published recently by the Food and Nutrition Service of the Southeast region of the U. S. Department of Agriculture (USDA). Paris was scrutinized for three months, from last September through December.

Paris supplies food stamps, Aid to Families with Dependent Children (AFDC) and Medicare benefits to approximately 320,000 Georgia residents. Case workers in 159 counties use approximately 500 terminals to transmit data to 11 IBM 4331 processors running under OS. Data is transmitted nightly to an IBM 3081 for batch processing.

Paris' rocky implementa-

tion began in April 1981 with a one-year pilot program in one county. Eight other counties were added to the system in May 1982. Statewide implementation began the following October, but was halted in February 1983.

"Part of the problem was that we added too many counties too quickly to the system," said Jeanne Pruitt, MIS director for the Division of Family and Child Services in the Georgia Department of Human Resources. "We also converted from an IBM 3033 to an IBM 3081. There were conversion problems: The computer center went to pot and we almost killed the system."

When the problems were corrected in June 1983, other counties were gradually added to the system, and all offices were using it by this past March.

The USDA report stated that during the 1983 September to December review period, Paris was not equipped to handle the number of cases generated. Because the system was overloaded, case workers were unable to access it for up to half a day at three USDA test sites.

"Initially, we didn't have

the proper mix of new and old cases," Pruitt said. "With most systems, 90% of the transactions are changes to current cases, only 10% are new cases. Initially, we had the opposite ratio. Creating new cases requires additional time and computing power."

In addition to processing new cases, the transformation from a manual to an automated system slowed productivity, Pruitt said. "We were introducing terminals and computers to people who had not seen them, let alone worked with them," she said. "It was a new way of working. Some case workers were not adequately trained, and those who were trained did not have sufficient experience to become adept at using the system."

Some case workers resist-

ed Paris, according to Pruitt. "Checks and balances were built into Paris to ensure that workers used the system. Some users found ingenious methods to circumvent the system, and we were forced to redesign the system."

The USDA report stated that Paris was also slow to deliver host-produced reports that case workers required. Often, five to nine days would pass before these reports were received by the district offices.

Pruitt stated that Paris' batch processing is completed on Monday, Wednesday and Friday of each week. "Data that is input on Tuesday should reach the case worker on Thursday," she said. "We are trying to cut our batch processing time from 17 to 12 hours so we can complete the batch process-

ing every night. That should decrease the time required to produce reports."

Duplicate food stamp benefits were issued when other counties converted to Paris. "There were procedures in place for the conversion," Pruitt said. "The county office was supposed to stop sending benefits as Paris began issuing them. Timing was crucial. I think some counties followed the procedures well, others did not."

By examining each county's conversion period records, Pruitt's department hopes to identify all the duplicate benefits cases. "Identifying duplicate benefits issued by counties with automated systems will be relatively easy," Pruitt said. "Locating duplicate benefits in those offices using manual systems will be a problem."

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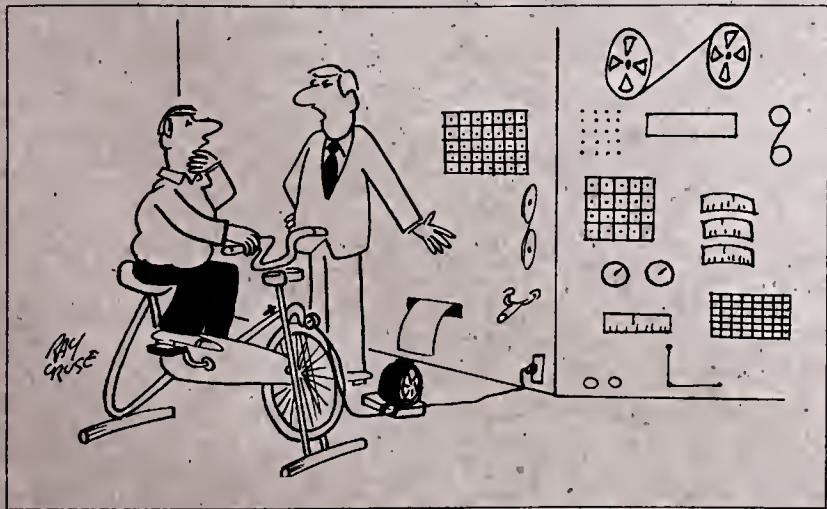
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## NEWS



## CALENDAR

## WEEK OF JUNE 17

JUNE 20-22, ANN ARBOR, MICH. — **Data Communications Networks: Planning and Computer-Based Design.** Contact: DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

JUNE 20-22, BEIJING, CHINA — **The First Joint Institute of Electrical and Electronics Engineers/Chinese Institute of Electronics (IEEE/CIE) Technical Conference.** Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

JUNE 21-22, WASHINGTON, D.C. — **Data Administration: Development and Practice.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

JUNE 21-22, NEW YORK — **Data Base Alternatives for the IBM World.** Contact: Techtran, 72 Cummings Point Road, Stamford, Conn. 06904.

JUNE 22, NEW YORK — **Local Area Networking.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

## WEEK OF JUNE 24

JUNE 25, NEW YORK — **Introduction to the IBM Personal Computer.** Contact: Center for Advanced

Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

JUNE 25, NEW YORK — **Word Processing with Multimate.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

JUNE 25-26, CHICAGO — **Data Communications II — Digital Communications Systems.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

JUNE 25-26, CHICAGO — **Principles of ADP Project Management.** Contact: U.S. Professional Development Institute, ADP Project Management, Department AB, 1620 Elton Road, Silver Spring, Md. 20903.

JUNE 25-26, NEW YORK — **Beyond System/34: IBM and Non-IBM Alternatives.** Contact: Techtran, 72 Cummings Point Road, Stamford,

Conn. 06904.

JUNE 25-26, WASHINGTON, D.C. — **Security Management Forum.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

JUNE 25-26, CINCINNATI — **Lotus 1-2-3.** Contact: Personal Computer Management Association, 11928 N. Earlham, Orange, Calif. 92669.

JUNE 25-26, BOSTON — **Understanding and Negotiating Contracts for Business Computers and Software.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

JUNE 25-26, ORLANDO, FLA. — **IDMS-DC Transaction Design.** Contact: Harris Education Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

JUNE 25-26, KANSAS CITY, MO. — **Supporting and Maintaining the Communications Network.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

JUNE 25-26, BOSTON — **Software Law: A Legal Primer for the DP Professional.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held June 28-29 in Washington, D.C.

JUNE 25-27, PARSIPPANY, N.J. — **Data Processing for the Non-DP Manager.** Contact: Chubb Institute, P.O. Box 342, 80 Sylvan Way, Parsippany, N.J. 07054.

JUNE 25-27, ALBUQUERQUE, N.M. — **Association for Computing Machinery and the Institute of Electrical and Electronics Engineers 21st Design Automation Conference.** Contact: IEEE Computer Society, P.O. Box 639, Silver Spring, Md. 20901.

JUNE 25-27, GAITHERSBURG, MD. — **The Forefronts of Large-Scale Computational Problems (FF '84).** Contact: William L. Schrader, Newman Laboratory, Cornell University, Ithaca, N.Y. 14853.

JUNE 25-28, BOSTON — **Structured Programming.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

JUNE 25-29, SUNNYVALE, CALIF. — **Network Performance Management.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

JUNE 25-29, NEW YORK — **CICS Command-Level Programming.** Contact: Sysed, One Park Ave., New York, N.Y. 10016.

JUNE 25-29, PHOENIX — **Project Planning and Control Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JUNE 25-29, WASHINGTON, D.C. — **C Language.** Contact: Webco Industries, Inc., P.O. Box 15505, 8513 Washington Ave., Alexandria, Va. 22309.

JUNE 25-29, DENVER — **Structured Analysis and Design Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

JUNE 25-29, ORLANDO, FLA. — **CICS Programming Workshop.** Contact: Harris Education Center, 1025 W. Nasa Blvd., Melbourne, Fla. 32919.

JUNE 25-29, WASHINGTON, D.C. — **Structured Analysis and System Specification.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

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**JUNE 26, PHILADELPHIA — Lotus 1-2-3.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810. Also being held June 29

in Boston.

**JUNE 26, NEW YORK — Spreadsheets Using Lotus 1-2-3.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10036. Also being held June 27 in New York.

**JUNE 26, NEW YORK — Knowledge Applications Development.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10036.

**JUNE 26-27, NEW YORK — Getting Results with Electronic Mail.** Contact: Business Communications

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**JUNE 26-28, NEW YORK — PC Expo.** Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07630.

**JUNE 26-29, NEW YORK — CICS Application Design.** Contact: Sysed, One Park Ave., New York, N.Y. 10016.

**JUNE 26-29, CHERRY HILL, N.J. — Computer Network Design and Protocols.** Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45404, 6305 Arizona Place, Los Angeles, Calif. 90045.

**JUNE 28-29, NEW YORK — Optimizing Long-Distance Services.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

**JUNE 28-29, BOSTON — Software Engineering.** Contact: Battelle Seminars and Studies Program, P.O. Box C-5393, 4000 N.E. 41st St., Seattle, Wash. 98105.

**JUNE 29, NEW YORK — Advanced PC-DOS 2.0.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

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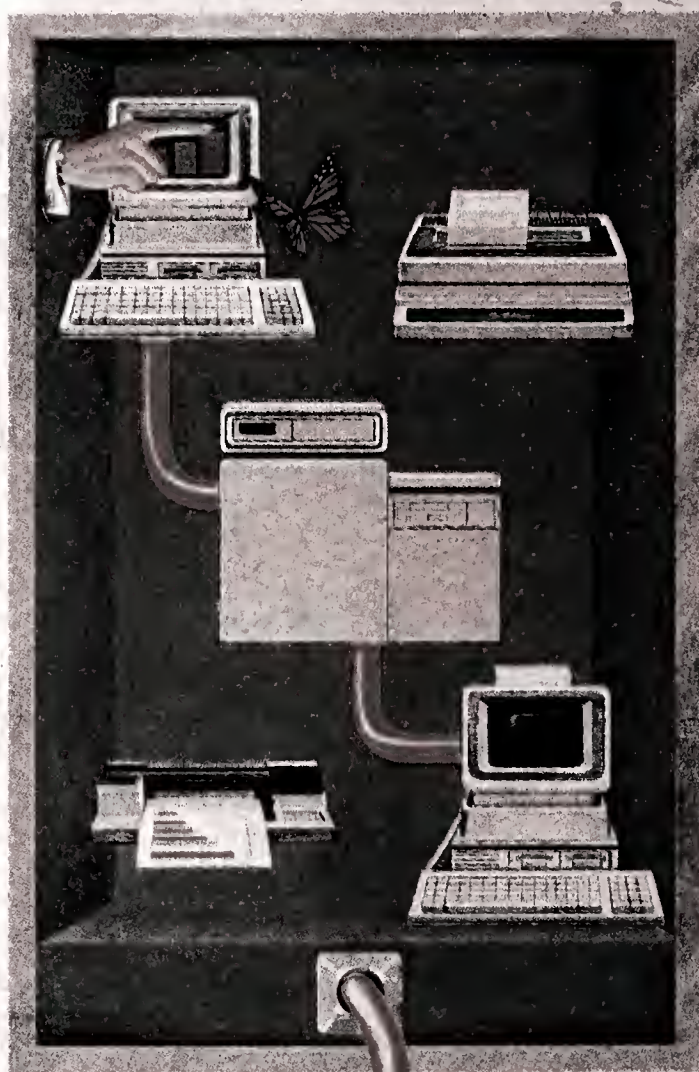
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# EDITORIAL

## Life's bitter lessons

Depending on your perspective, there appears to be an increasing number of lessons to be learned from Trilogy Ltd.'s continuing failure to change the face of mainframe computing overnight. Let's start with an obvious one:

*If it sounds too good to be true, it probably is.*

What Trilogy initially proposed to do — build superfast, IBM-compatible mainframes utilizing a new (that is, untested) wafer-scale technology — was a truly formidable task, even if Gene Amdahl and son Carlton were the driving forces behind the company. There were simply too many reasons why the plan wouldn't work in the time frames set by the company.

The entrepreneurial spirit notwithstanding, should Trilogy realistically have been expected to produce — in less than three years — a machine that would vastly outperform not only IBM's existing line of mainframes, but also anything IBM or Japan, Inc. might develop within the same time frame? Using a radically different chip architecture that existed on paper only? Without a development team that had worked as a unit for any appreciable amount of time? In the face of research and development costs, not to mention manufacturing costs, that would tax even the giants of the industry?

Sure, a formula like the one above with similar parameters worked once for Gene Amdahl at the company that still bears his name. But that was a decade and a half ago, when the computer industry was nowhere as volatile and risk-laden as it is today.

Nonetheless, enough investors, including Digital Equipment Corp. and Sperry Corp., staked a total of about \$250 million, hoping the Amdahls could pull a rabbit from the hat and set it loose long before the hounds could pick up the scent. That brings us to lesson No. 2:

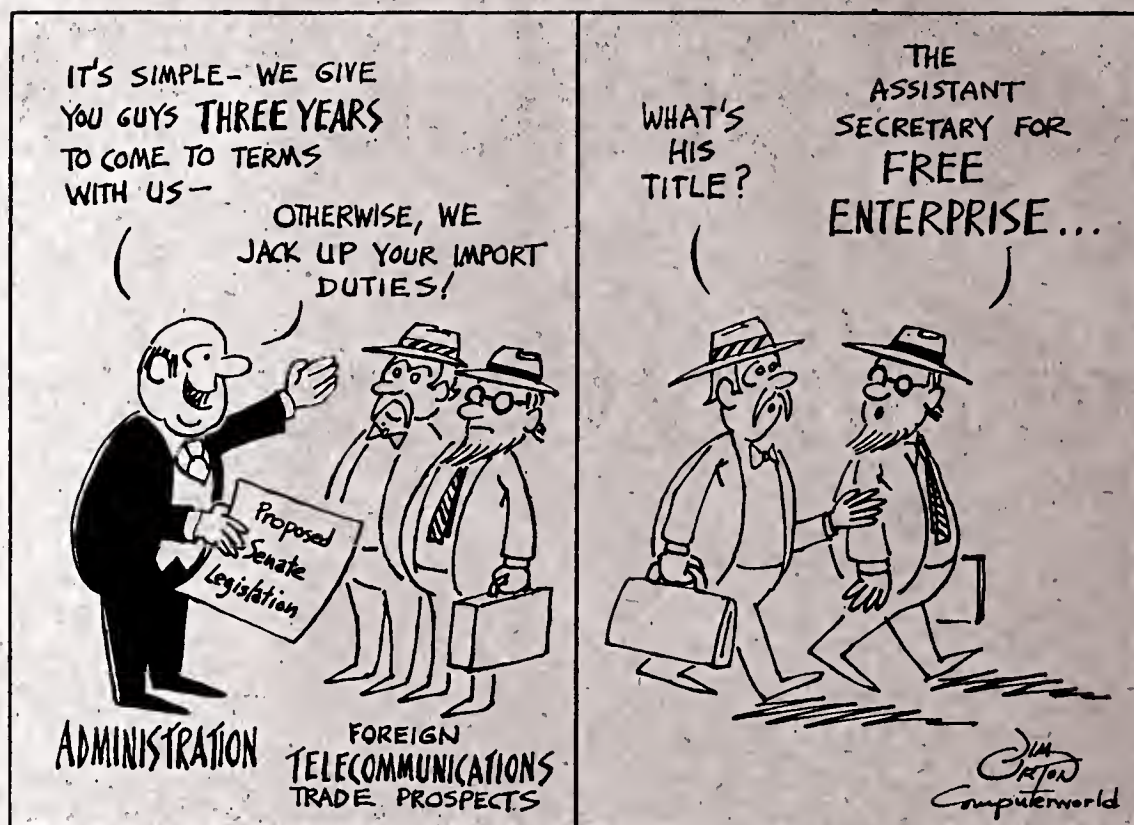
*There are no free lunches.*

Hindsight, of course, is 20-20, but why didn't anyone think to ask how a company that would have to spend hundreds of millions just on product development could have any money left to market and support something as complex as a mainframe with 40 millions of instructions per second — especially a company without a revenue stream?

What about the painful lessons learned by many of the other plug-compatible mainframers in the wake of the dismissal of the U.S. vs. IBM antitrust suit? Has anybody noticed what's happened to Magnuson Computer Systems, Inc., Storage Technology Corp., IPL Systems, Inc. and others lately? IBM is not about to lose its mainframe salience to trench raiders.

And what of the Trilogy chip technology? After all, that's what the DEC's and Sperry's and Control Data Corp.'s most covet. In this case, given Trilogy's delays in getting its wafer at least to stay viable and not short out while in operation, it's getting to look more and more like the lesson to be learned here is one of life's most bitter:

*There's a sucker born every minute.*



## LETTERS

### Is theft of company resources OK, offensive or just a matter of words?

I'm not sure I got the point of your editorial, "Getting away with it" [CW, May 7]. Does it "net down" as follows?:

■ An employee's theft of company resources is particularly offensive because it violates an implied obligation of employment, even though it's easy and practically risk-free and almost everybody does it.

■ An employee's theft of another company's resources is okay, even though it violates an implied obligation of purchase, because it's easy, practically risk-free and almost everybody does it.

I know these weren't the exact words, but I think I've captured their essence. It is just a matter of words, isn't it?

Mark Barnett  
Palo Alto, Calif.

### Technical manuals: Illustration only part of visual communication

I was disappointed that Priscilla Burgess' "The tyranny of words" [CW, April 16] only told part of the story about visual communication.

It is obvious that Burgess is competent in her field — communication research — and that she is interested in visual communication by way of illustration. Most of us would agree with her opinion that writers who have devoted their lives to words don't think as much about how the written page looks as much as what it says.

In my opinion, her article misses the boat as far as design goes, though. She stated, "When professional artists are employed to design or illustrate manuals, writers have difficulty in figuring out what . . . should be written. Left on their own, artists [will] frequently decorate rather than illus-

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# VIEWPOINT

## EEC vs. IBM



### LECHT ON SCIENCE

Charles P. Lecht

The commission of the European Economic Community (EEC) investigating alleged marketing abuses by IBM for the past decade would do itself and the world a favor by reaching a negotiated settlement to end the inquiry without litigation — and fast. However justified the complaint of the Common Market countries may once have been, it's time they noticed that despite their allegations, most European businesses still prefer Big Blue products — even when offered economic incentives to buy homegrown alternatives. And it isn't for love of America; the EEC, non-U.S.-owned computer systems manufacturing community has been unable to offer anything that has radically changed the inclination of Europeans to buy IBM mainframes except, not surprisingly, when they make or purchase for resale IBM look-alikes. Not that there aren't some very successful EEC manufacturers in the mini and smaller classes of systems products. But when big bucks are involved, Big Blue is selected over 50% of the time.

In view of this, the commission would be well advised to reassess what it intends to accomplish in bringing charges against IBM. With Big Blue comprising the major portion of Europe's installed base, an attack on its ultimate source of technology, warranted or not, may result in a form of self-mutilation for European industry. As the EEC screw turns, IBM will be ever-less inclined to increase its already considerable investments in Common Market countries. Its installed base of us-

*Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.*

ers will suffer the consequences of this, including more costly spare parts, maintenance and so on. Since no one else seems able to take over IBM's role in Europe — or even come close to doing so — the outcome could be disastrous.

The commission should take its cue from the U.S. government, which ended its action against IBM in 1982. Finding a negotiated solution must have become mighty attractive to our Justice De-

*With Big Blue comprising the major portion of Europe's installed base, an attack on its ultimate source of technology . . . may result in a form of self-mutilation for European industry. As the EEC screw turns, IBM will be ever-less inclined to increase its already considerable investments in Common Market countries. Its installed base of users will suffer the consequences of this.*

partment after finally realizing that no one else in America could fulfill IBM's vital role here either. That 13 years of testimony for the case were stored on IBM's systems (as was a goodly portion of departmental records, those of the Federal Bureau of Investigation, the Central Intelligence Agency and heaven knows what else) may have given them the clue as to what to do. However exalted their moral purpose in legal pursuit, they must have ultimately recognized that a blow to Big Blue would backfire in a big way.

No group of businessmen is more individualistic than the Europeans. That they frequently choose

foreign computer equipment over alternatives produced locally, despite pressures to the contrary, confirms this. In the Common Market countries, "foreign" is not necessarily "far away" and, all else being equal, "buying closer" usually means "buying cheaper." Even though European business has been given every inducement to buy homegrown (or at least EEC-grown) products, demand for IBM equipment in Europe has always been high, no matter where it came from. This has remained true for so long that Big Blue was brought into each country to create research and/or manufacturing plants so that its products would be available locally and, thereby, obtained more cheaply. Many EEC governments actually gave IBM incentives to set up shop.

Indeed, I'd be surprised if the EEC's own administrative offices didn't sport a Big Blue system or two. I know its constituent governments all have IBM facilities; even the Vatican has them, although I cannot say whether this implies a divine endorsement. We can only assume that the commission reflects the anguish of European computer manufacturers, whose every effort seems destined to defeat by managerial ineptitude, worker revolt or government blundering. At the running out of U.S. partners, mostly driven out by EEC governments, their subsidized computer companies, which includes all of those making systems above a mini, have taken to wooing Japanese partnerships. In view of the fact that these Japanese companies are capable of producing some IBM and Honeywell, Inc. products as well as IBM and Honeywell, European intentions are clearly to replace their dependencies on these companies. But unless European manufacturers, management and staff cut out their preoccupation with goofing off and politics and get back to work, the results of production in EEC factories may make our hard-working Japanese friends wish they had stayed home.

That the products of ICL Ltd., Siemens Corp.,  
See EEC page 36

## Pentagon's shopping spree: Apples for strategic warfare



### HUMAN CONNECTION

Jack Stone

If you didn't catch the news squib about the Pentagon brass buying up off-the-shelf Apple Computer, Inc. machines for the Nato forces because "the procurement cycle for milspec machines took too long," then you missed a humdinger.

Testimony before the U.S. Congress by the general staff indicated that small-business-class Apple configurations were performing just fine during recent war games played on the continent, handling the nuclear targeting chores peachy keen. (My private sources informed me that the Apples are only to be considered interim to the ruggedized, nuclear-radiation-proof, customized machines due out later this decade at 10 times the cost.)

It's not too difficult to imagine how the head honcho of the U.S. Army went shopping for his shiny new acquisitions.

The time: Spring 1983.

The situation: Senior General of the Armies Kensington Kaldron, dressed in his best polyester civvies, is strolling down K St., Washington, D.C., a.k.a. Computer Alley, accompanied by his stalwart driver/cook/valet/personal programmer,

*Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.*

Melvin Goldkin, who is outfitted in a grey pin-stripe zoot suit.

Every so often they furtively glance over to a personal computer store window, sneaking peeks at the latest hardware displays without making their mission objective too obvious to potential snoops. They pause at the Ye Olde Little Tiny Petite Computer Store, Health Foods Center and Mystical Book Publisher, which has a large hand-lettered sign pasted on the window: "Apple II's on Super Sale for Cash. Buy 'em While They're Fresh — They Won't Last Forever."

The general bends over to Melvin's ear. "Private, this may be our answer. The Russians would never suspect this place as the source for our Nuclear Keydata Entry and Reduction System — or Nukereds. Let's rush in unhurriedly."

Melvin nods approvingly, and the two race through the door casually to encounter a 17th century craft house setting with simulated log cabin walls, knotted pine flooring, several spinning wheels, a blacksmith anvil and a bunch of Apples, each churning away with a different demo program.

A lady attired in brightly configured costume, simulating one assembled circa 1682, waltzes up. "Prithee, kind sirs. May I wont to render my assistance to thee?"

The general leans down to the private, curls up the corner of his mouth and hisses, "Mel, baby boy, we've got it. We may have found our supplier!" He then turns to the sales mistress: "Madam, as a member of the Arlington County School Board, I am interested in purchasing a large number of these machines to help our grade-schoolers gain the knowledge and expertise necessary to build their logical thinking capability as well as lay the

foundation for a future career with computers. What can you recommend?"

"Mayhap and forsooth, we have the answer. Firstly, children need to sense real-life situations to accelerate life's experiences and build higher levels of confidence. Here is our Tactical Fighter Emulator in operation, a remarkable piece of software that allows the kids to experience combat flying in the U.S. Air Force's F-22, which is rigged with nuclear-tipped missiles. For every Russian Mig that is downed, a jellybean drops out of the chute."

"You're right on track, ma'am," the general glowed. "Eh, Meleroni?" The private smiled agreeingly.

The sales mistress continued, "Now this machine is running our cunning Data Base Manager, which introduces kids to the logical information process as a prerequisite to human decision making. The children play a modern day version of soldiers, in which they assemble data on U.S. and Soviet military resources and process the file to analyze force strengths and weaknesses."

"Oh, a gasser, a global gasser. Just what we need."

"This one is the craftiest of all. It's a spreadsheet that helps teach the kids long-range planning. They have such fun identifying potential nuclear targets in the Soviet Union, assigning weighting factors to them, then varying the values of critical selection parameters to project target priorities."

"And the total cost for the Apple is only \$2,495, plus \$25 for the printer cable. You supply the monitor."

"You've just won an order for 10,000 units. By the way, do you sell a hardened version?" ‡



## VIEWPOINT

## EEC from page 35

Olivetti Corp. and others like them did not gain wide enough acceptance in their own countries, let alone in major marketplaces abroad, may be judged by some to be the result of IBM's unlawfully applied powers in the European arena. Really, to accept this judgment, we'd have to accept the premise that IBM has achieved what the EEC has never been able to, namely, the unification of the European community on an issue of serious economic consequence. The commission's action betrays its unspoken conviction that an act of hypnosis would be required to make its membership agree about anything; ergo, the European consensus on the desirability of IBM's products must derive from voodoo marketing by its salesmen.

## More than a little sardonic

That the Common Market's commission actually believes that it can honestly prosecute IBM for marketplace abuses while the governments they represent are busily preparing to tighten their grips on Big Blue's computer industries through their state-controlled communications companies is ironic. That they are doing so with IBM equipment is more than a little sardonic. That all this is happening against a backdrop of outrageous and incessant bungling by the management in many EEC, non-U.S.-owned, high-technology enterprises may cause one to gasp in astonishment. Even if IBM were to give them early notice of component inter-

face data, currently a rumored settlement condition of the EEC, most wouldn't know what to do with it.

Let's face it, for many years IBM gave it away freely — hardware, software and firmware. Apparently, only the Japanese figured out what to do with it. During these same years, most EEC computer manufacturers seemed weirdly unaware, even disdainful, of its value. This, in the face of mounting evidence that IBM systems were what European businesses mostly wanted, was unforgivable.

The commission's allegations that Big Blue may in some way be responsible for the lack of success by would-be EEC competitors gives IBM too much credit for planning and EEC company management too little appreciation for the magnitude of its blunders. Orchestration of Europe's surrender to its computer industry may have been in IBM's plan, but the fact that it was total was mostly caused by the arrogance of potential competitors in the Common Market's technology companies. Echoes of their pronouncements proclaiming the production of systems that would compete head-on and across the board with Big Blue still ring hollow in our ears.

Always status-conscious, European manufacturers wouldn't dream of choosing anyone less prestigious than a blue chip company the likes of IBM upon whom to heap the blame for their own ineptitude.

Indeed, not to be considered an IBM target for sinister monkey business would be demeaning, if not

downright insulting.

How much money has been siphoned from the British, French, Italian and German governments to underwrite failing indigenous high-technology businesses — whose title to such assistance was based on the claim "Now we are noticed!" — will never be known, but is assuredly huge.

To hatch a plot that would have served to undermine the plans of an average EEC high-technology company, IBM would have had to discover what these were. Hiring Sherlock Holmes and (yet another) Watson would not have helped. Wracked by continuous upheavals in management, poor judgments in foreign business alliances and labor strife that borders upon insurrection, the European-owned computer companies have had little chance to plan anything of enduring value. Thus, whatever competitive plans they may have concocted to thwart IBM were destined to be demolished before Big Blue could address them — legally or not.

## Skating on thin ice

Moreover, the Common Market's commission is skating on thin ice if its case against IBM alleges unethical business practices. Talk about the pot calling the kettle black! The near-total disregard for the niceties of the law (especially those relating to paying taxes) and the free-swinging sense of propriety in European busi-

nesses I've witnessed are exceeded in pervasiveness only by the utter lack of personal control exercised by errant workers whose only strengths seemed to be expressed in an unstinting dedication to wreck their companies from within.

But much more than hypocrisy is at stake: factories and laboratories established by IBM in European countries providing income for tens of thousands of workers, for example; the transfer of technological know-how gained by these workers; or the availability of superior systems to Europe's businesses.

That some IBM management may conclude they deserve medals for keeping Europeans equipped with first-rate gear while the Common Market companies get their acts together, if perhaps presumptuous, should come as no surprise. Neither should the fact that some marketing excesses may occur in a company with a few hundred thousand workers — chicanery is not the privileged province of any one company; I suspect it's uniformly distributed among all.

While the tone of today's negotiations to settle the decade-old inquiry remains conciliatory, the EEC would do well to end this affair, or it may get more than it bargained for. Its actions will not escape the notice of all foreign companies doing business in Europe. And if the result is bad enough, IBM may be just the first to withdraw.

## LETTER from page 34

trate." I think the key words here are "left on their own." I agree that illustrators sometimes get carried away with the illustrations. Usually, though, a team effort will correct this problem. Of course, collaborative efforts must be made to produce a document that communicates well. Burgess states this herself later in the article.

However, she says nothing about communication by design. The way the page is laid out can have a great effect on communication. Type style, size and color can add flavor, communicating a mood that words alone cannot. Size of type, boldness, place-

ment and white space communicate importance, as well as direct the reader's eye across the page. Color stimulates attention and can be used effectively in modularizing large documents. Consistent placement can have a stabilizing effect on the reader, giving perceptual organization to a document. Grid design does this very well.

I agree that communication is the most important purpose of any technical document. But to limit yourself to communicating using only words and illustrations is not the whole picture. It is too bad that Burgess hasn't discovered this.

Amy W. Klingman  
Campbell, Calif.

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## COMPUTERWORLD







# SOFTWARE & SERVICES



**SOFTALK**  
Paul Gillin  
CW Senior Editor

## Do users fear IBM backlash?

**W**hen IBM announced in February 1983 that it would restrict source code availability on selected systems software products, it must have anticipated a backlash from the user community. Witness the fact that the computer giant took pains to assure users that the conversion would be carried out in a manner that would minimize disruption to their operations. However, more than 15 months later, many users are not convinced that the object-code-only practice will be anything less than a major headache when they convert from modified systems software to enhanced versions that are restricted by object code only. In fact, some users have stated flatly that they will standardize on the most recent version of some software for which source code is available. That is an important sacrifice, given that one piece of systems software is often impacted by many other products. Users may find that such a decision will leave them in a lurch several years down the road.

The opposition to object code only has apparently not fazed IBM, which had extended the practice to cover 65 products by the end of last year from the 10 that were originally announced. Characteristically, IBM has tried to mollify users with reassurances that their voices are being heard. Certainly, the company's willingness to comment publicly on the issue indicates that it is concerned about adverse publicity.

In reality, users can expect to have little impact on a Big Blue decision that the company seems determined to carry out. But that doesn't mean they should stop trying. What is unusual about the object-code-only issue is that so many

See **CODE** page 46

**SOFTLINE**/Douglas H. Donath

## Steps to preserving system integrity

**C**omputerized record keeping is now standard among all but America's smallest businesses. As a result, computer security cannot be over-emphasized. Estimates of losses due to computer crime now range up to \$3 billion annually. These are due not so much to big-time fraud, but to regular abuses on the \$100 to \$1,000 scale.

Here are 15 simple security guidelines to help protect your system and preserve the integrity of your records:

■ Protect your hardware. This is the

*Donath is vice-president at Creative Computer Resources, Inc. in Costa Mesa, Calif.*

most basic of precautions, yet it is one many users tend to overlook. Although physical barriers offer no protection against electronic tampering, they do defend against assault by irate customers or disgruntled employees.

Keep your main computer in a secure location. If you can't afford the vault-like enclosures and magnetic access passes used by many major corporations, at least find an out-of-the-way room with a heavy door and good-size lock. Never put your computer in a room with a window to the outside. And restrict access only to those people with business in the area.

■ Lock your equipment. Power to the See **GUARD** page 47

## Cincom offers micro-mainframe support system

**CINCINNATI** — Cincom Systems, Inc. recently announced its Personal Computer Support System (PCSS), which the company said links NCR Corp.'s mainframes to Intel Corp.'s 8080 series microprocessor-based microcomputers.

According to a spokesman, the PCSS is designed to work with virtually any 8080-based micro under either Microsoft, Inc.'s MS-DOS or Digital Research, Inc.'s CP/M operating systems, including NCR's Decision Mate V, the IBM Personal Computer XT and Wang Laboratories, Inc.'s Professional Computer.

The PCSS consists of five major components, the spokesman said. A terminal emulation feature allows the micro to operate as a page-mode terminal linked to the mainframe via an asynchronous communications link. The PCdatabas feature enables a microcomputer programmer to call

See **PCSS** page 47

## AT&T strengthens Unix V with port to Motorola micro

**By John Gallant**  
CW Staff

**GREENSBORO, N.C.** — AT&T Technologies strengthened its software support for Unix System V recently with the introduction of a ported version of System V for Motorola, Inc.'s 68000 microprocessor and a package aimed at improving programmer productivity.

According to a spokesman, Unix System V/M68000 is a port of AT&T's Unix System V operating system for Motorola's 68000 microprocessor. The System V/M68000 product announcement stems from a joint agreement penned in May 1983 between AT&T and the four largest U.S. microprocessor manufacturers — Motorola, National Semiconductor Corp., Intel Corp. and Zilog, Inc.

Under the agreement, each company pledged to develop a port of Unix System V See **UNIX** page 46

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## Mathematica touts Ramis II enhancements, IBM distribution pact

**By Paul Gillin**  
CW Staff

**LOS ANGELES** — Mathematica Products Group, Inc. (MPG) used its recent 1984 Roundtable users group meeting as a forum to introduce a variety of new and enhanced products. They include a version of MPG's Ramis II very high-level language and data base management system (DBMS) for the IBM Personal Computer XT/370, a data maintenance facility (DMF) for mainframe Ramis II, a menu-driven reporting system and an agreement that provides for the company to market the IBM Personal Computer XT/370 as a value-added distributor.

Ramis II/PC is said to provide the same capabilities currently available with Ramis II on the mainframe, and it offers portability of applications from the mainframe to the Personal

Computer XT with no modification.

Priced at \$1,395, Ramis II/PC includes the Data Base Manager; Reporter, a report writer; DMF; Executive, a library of Ramis II requests; Graph; Interactive Request Modification, which lets the user develop requests in an evolutionary manner; Screen Manager, a full screen editor; Ramerror, which provides an explanation of errors and suggests corrective actions; Reporting From External Files; and Ramservice, which includes a variety of utility functions.

Four separately priced options are also available on Ramis II/PC. Formatted screen manager (\$285) is used for painting screens and menus. Relate (\$285) is a facility for combining data dynamically from multiple data sources. Ramlearn (\$50/year per educational module) is a comput-

er-based instruction component, and Ramis II English (\$1,195) is a natural language comprehension component.

In line with the Ramis II/PC announcement, MPG also revealed that it would sell the Personal Computer XT/370 bundled with the new Ramis software. Initial deliveries are scheduled for next month, with prices ranging from \$12,070 for a 10M-byte Model 588 to \$14,756 for a 20M-byte Model 568. Prices include Ramis II/PC and all required IBM VM/Personal Computer software. Peripherals and other Ramis II/PC options are additional.

DMF, which is provided as a free enhancement to Version 84.1 of Ramis II, is said to extend and simplify file maintenance using a single MAINTAIN command. The command can be used to add, modify and delete data; locate records; display data;

perform calculations and validation and reject and log transactions based on matching or validation criteria. Transactions can be obtained from sequential files, line terminals, formatted screens or microcomputers. Processing is in either on-line or batch mode and is independent of transaction source and layout, a spokesman said.

The new menu-driven reporting system, dubbed Marvel, supports all features of Ramis II Reporter, including access to IBM's IMS and DL/1, Cincom Systems, Inc.'s Total and Software AG of North America, Inc.'s Adabas DBMS, as well as to IBM's Vsam and sequential files. The software uses an intelligent series of prompts to guide the user through report preparation.

Marvel can be executed from an See **MPG** page 44



## SOFTWARE &amp; SERVICES

# Micros, Cobol compiler speed McAuto's programming

HAZELWOOD, Mo. — The rising cost of using an IBM 370 mainframe for data entry was making applications software development increasingly expensive at McDonnell Douglas Automation Co. (McAuto) here. So the company recently decided to transfer many of its development activities to IBM Personal Computers.

Ken Ray, senior section manager for the firm's management control systems, said management decided the microcomputers were needed because of the added power and flexibility they provided. After evaluating the systems that were available, the managers decided the IBM Personal Computer would provide not

only the easiest migration path, but also the best return on investment.

"With as much Cobol application software development work as we carry out, it was obvious that distributed data entry would not only be less expensive, but would expedite our programming turnaround," Ray said.

Developers found that by using a special compiler, they could execute code four times faster than with any other Cobol alternative available for IBM Personal Computers, Ray added.

"We tested all of the major compilers," he explained. The company chose the MBP Cobol Compiler from MBP of Oakland, Calif. McAuto offi-

cials found that the compiler ran more than four times faster because no interpretation of run times was required. Ray explained that the MBP Compiler increases speed by generating native machine language code rather than slower pseudo codes. The organization's experience indicated that an entire program can be translated in a single step instead of by processing each statement for every application.

Ray said that when dealing with large, complex programs such as those developed by the company, fewer piece strokes were needed. As a result, work was processed faster, even though it was on the less power-

ful micros.

The MBP Cobol compiler was also easily integrated into the production environment, Ray noted. "When you are involved with restrictions such as operating on a microcomputer, you need a very strong adherence to standards such as Ansi Cobol 74 Level 2 to ensure that your work is portable," he said. "With the MBP Cobol, we were able to transfer our routines to the more cost-effective system quickly and easily."

The staff found that it was able to make the conversions more quickly because with a simple Call statement staff members were able to create entire libraries of screens easily, Ray commented.

During the conversion process, the McAuto team used the MBP symbolic debug system to set break points as well as to carry out single-step traces. Using the debugger, programmers were also able to modify values or transfer control to other modules in their programs.

Because of the initial design of the McAuto programs and the nontechnical level of many of the target users, most of the applications software was menu-driven. Despite the range of parameters that had been set up during the development process, the developers were able to transfer control to other programs used in the vertical market areas without difficulty, Ray said.

"We are already seeing major paybacks we hadn't anticipated," he said. "We can already see that by putting this much power closer to our people they are more committed to their projects because they can see results more quickly."

He added that it is difficult to quantify improvements that have been achieved at this early date, but that efficiencies are being found every day. "The key is having the right development tools and techniques available so your people don't get discouraged at the start," he said. "Well-written, structured and orderly compilers like MBP Cobol made a big difference in making the conversion with a minimum of disruption."

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## Prime machines get software tool

PHOENIX — Database Systems Corp. has announced Transact Plus, a fourth-generation application development system for Prime Computer, Inc. computers. It features a high-performance report programming and processing language that extends the capabilities of Transact, installed in over 600 locations worldwide.

Transact Plus is designed to reduce programming time for developing high-performance, multiterminal application systems. Its components include the firm's Executive for application development and its Run Time system for high-performance execution.

Transact Plus is priced at \$22,000, with subsequent Run Time systems priced at \$6,000, the vendor said.

Database Systems is located at 1118 E. Missouri Ave., Phoenix, Ariz. 85014.



## SOFTWARE &amp; SERVICES

## IBM micros, mainframes get file link

MIDLOTHIAN, Va. — Performance Software, Inc. has introduced a software system designed to enable file transfer between the IBM Personal Computer and compatible microcomputers and IBM 370, 4300 and 30 series mainframes.

According to a spokesman, Masterlink provides direct access to mainframe files such as IBM's Vsam and Power as well as spool and program library files. The software operates under IBM's CICS in either the DOS/VSE or MVS environment, and its data security capabilities reportedly protect data down to the field level.

The Masterlink system also features data transformation capabilities that reformat mainframe data into the specific format required by micro programs, including Lotus Development Corp.'s 1-2-3 and Ashton-Tate's Dbase II. The system is said to appear to the mainframe as a job under CICS in any IBM 3270 terminal communications environment, and it can receive or transmit data in delayed mode or in real-time.

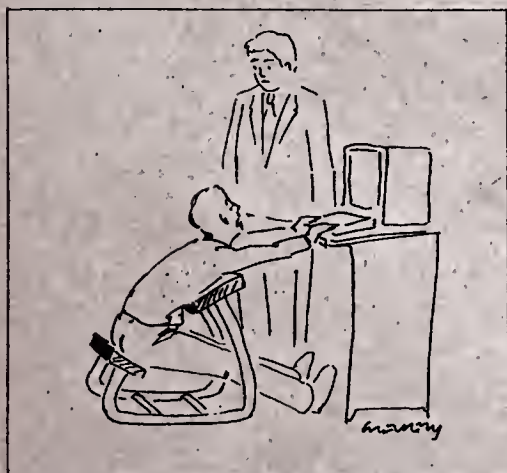
The Masterlink system's data dictionary is said to provide users with the ability to select only those mainframe data fields needed by the micro program. The data dictionary describes the access method, the fields and the order of data contained in the mainframe files — information that is later used in data selection.

The system also provides a menu and a fill-in-the-blanks screen for entry of file transfer requests, which are then stored in a queue file on the mainframe. When Masterlink's Mlink program runs on the destination micro, all transfer requests in the mainframe queue file are processed in priority sequence.

Masterlink reportedly also supports attachment of the Personal Computer as an IBM 3278 or 3279 terminal display using coaxial cable. Remote configurations may use either Systems Network Architecture (SNA) or SNA/Synchronous Data Link Control communications.

A single-user Masterlink system is licensed for \$2,500. A multiuser system is licensed for \$5,000 plus \$1,000 for each micro attached after the second. An unlimited-user system, through which any number of micros can be attached with no additional cost per micro, is licensed for \$15,000.

Performance Software is located at 1009 Sycamore Sq., Midlothian, Va. 23113.



'Do you have any other models?'

## Automated support environment debuts

Said to simplify design and development of information systems

ANN ARBOR, Mich. — Isdos, Inc. has announced what it described as an automated support environment that simplifies the design and development of information systems.

Dubbed the Problem Statement Analyzer-Support Environment for Structured Analysis (PSA-SA), the system is said to automate the process of structured analysis in the development of software systems. The system is designed for use with IBM mainframes under VM/CMS and MVS/TSO and with Digital Equipment Corp. superminicomputers under VAX/VMS.

The PSA-SA package reportedly consists of four components. The Problem Statement Language/Problem Statement Analyzer (PSL/PSA) portion integrates system design and documentation maintenance capabilities, and a menu-driven Structured Analysis Interface feature guides an analyst through the system.

A predefined analysis package uses problem statement analysis to perform analysis from a single command and provides project management capabilities, such as "what-if" analysis. In addition, a Specification Document Generator is said to pro-

duce automatically a Structured Analysis Specification Document containing a context diagram, leveled data diagrams, data dictionary and any reports or screen layouts that have been entered.

The Structured Analysis Interface can be run off-line to a variety of microcomputers. Resulting statements can be transferred to the host computer for entry in the system's data base.

The total PSA-SA system is priced at \$48,000 from Isdos, Suite 103, 325 E. Eisenhower Pkwy., P.O. Box 4179, Ann Arbor, Mich. 48106.

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## SOFTWARE &amp; SERVICES

## Hogan unveils deposits system enhancements

DALLAS — Hogan Systems, Inc. has announced enhancements, including 24-hour processing capabilities and a test facility, to its Integrated Deposits System for IBM mainframes.

According to a spokeswoman, the Integrated Deposits System's transaction history file provides one logical data base for all demand deposit transactions, and it offers real-time updating for on-line posted transactions. The system is said to retain information from transactions and minimize the requirements for data base reorganization.

The 24-hour processing enhancement for time deposit and demand deposit accounting reportedly allows for on-line inquiries and dollar post transactions to be handled at any time. It allows single or multiple applications or companies to run batch posting concurrently without affecting on-line availability.

The Integrated Deposits System's test facility is said to provide users with fully documented tests and expected test results. It reportedly provides an efficient method for running system tests and verifying the results of those tests. The software's enhanced capabilities include a cost of funds report and a time deposits account summary of ownership.

The spokeswoman said the Integrated Deposits System was designed for use with IBM 370, 4300 and 30 series processors under most standard IBM operating systems.

The Integrated Deposits System is priced at \$300,000 from Hogan Systems, 5080 Spectrum Drive, Dallas, Texas 75248.

### SYSTEMS SOFTWARE

#### STERLING SOFTWARE MARKETING Tracs Version 1.7

Sterling Software Marketing, a subsidiary of Sterling Software, Inc., has announced Version 1.7 of its Teleprocessing Remote Access Control System (Tracs).

According to a spokesman, Tracs performs the binary synchronous transmission and collection of batch data between computers and remote devices and supports all releases of IBM's DOS and OS/MVS operating environments.

The spokesman said Version 1.7 features refined error detection, the ability to communicate in transparency mode with a greater variety of remote devices that send and receive object code and packed or binary data and the ability to receive multiple reports from IBM's JES2 and JES3 in a single transmission while maintaining the proper report format.

Version 1.7 of Tracs is priced at \$5,500 for DOS and \$8,000 for OS environments.

Sterling Software Marketing, Penthouse, Crocker Bank Building, 1007 Seventh St., Sacramento, Calif. 95814.

See **SYSTEMS** page 41

## Schonfeld offers decision support tool

EVANSTON, Ill. — A real-time decision support system has been announced by Schonfeld & Associates, Inc. The software, called Ingot, reportedly was designed for use in manufacturing, transportation and competitive bidding applications and corporate financial forecasting.

According to the vendor, Ingot features built-in models that can be executed by simple commands. Included are daily cash flow, corporate "creditworthiness," corporate valuation and replacement value accounting models.

A 10-year forecasting model, with capacity for 500 variables, is also included.

Ingot is said to have a standard universal interface to personal computers and word processing systems and a standard operating interface to permit its models to operate with other programs in the computer. Models are said to be executed line by line, a process that the vendor said warns of programming errors before the entire model is run.

#### Systems on which it operates

The software runs on general-purpose mainframes with a Fortran 77 compiler and main memory of at least 500K bytes, the vendor said. Among the systems on which it will operate are: Digital Equipment Corp.'s VAX-

11; Data General Corp.'s MV series; IBM's Model 4300 and up; Prime Computer Corp.'s Model 450 and up; Honeywell Information Systems, Inc.'s Model 6000; Sperry Corp.'s Univac 1100 series; and Burroughs Corp.'s Model 3900 and up.

The Ingot software package reportedly also includes business graphics, with automatic scaling and labeling, and a text editor capable of handling 50,000-line files without paging.

Ingot licenses for between \$30,000 and \$60,000, depending on CPU size, and is available from Schonfeld & Associates, 2550 Crawford Ave., Evanston, Ill. 60201.





## SOFTWARE &amp; SERVICES

**SYSTEMS** from page 40**AMERICAN MANAGEMENT SYSTEMS, INC.**  
**Inquirer**

American Management Systems, Inc. (AMS) has announced Inquirer, a relational data base inquiry tool that allows users to construct queries, define display formats, execute them on-line and save them for later use.

Inquirer reportedly operates on IBM mainframes under CICS for access to Vsam files. It is also available on Digital Equipment Corp. VAX-11 processors under VMS to access RMS-11 files. The software also works with AMS' Micro-Link Decision Support Interface for downloading data to an IBM Personal Computer.

Inquirer's language is modeled af-

ter IBM's SQL and includes standard relational operators such as SELECT and JOIN. The system has a user's guide written in tutorial form, on-line error detection and Help facilities. To install Inquirer, the user must define existing file formats to the Inquirer system. From that point on, Inquirer can access any existing Vsam file on IBM machines or RMS-11 file on DEC's VAX-11.

AMS markets Inquirer along with its Corporate Financial System; Oil and Gas Information System and Local Government Financial System products. Inquirer is priced between \$25,000 and \$35,000 when purchased with one of AMS' other applications products.

American Management Systems,  
1777 N. Kent St., Arlington, Va.  
22209.

**ENTERPRISE TECHNOLOGY CORP.****Dumper Version 8.0**

Enterprise Technology Corp. has announced Version 8.0 of Dumper, a high-speed disk backup/restore utility for use with Versions 7.0 through 8.0 of the RSTS/E operating system on Digital Equipment Corp.'s PDP-11 series computers.

The product is said to enable users to transfer individual files, whole user directories and entire disk structures or multiple-disk structures to and from magnetic tape, supporting all disk and magnetic tape devices currently supported by RSTS/E except floppy disks and Dectape, the vendor said.

Features include a read-after-write verify and an option to com-

pare the files on a Dumper tape with the corresponding disk files. Dumper is priced at \$825.

Enterprise Technology, 305 Madison Ave., New York, N.Y. 10165.

**SYSTEMS & SOFTWARE, INC.**  
**REX-SMA/186**

Systems & Software, Inc. has announced the REX-Structured Macro Assembler/186 (REX-SMA/186) package for Digital Equipment Corp. VAX-11 processors in native mode under DEC's VMS or Unix.

The vendor said that the REX-SMA/186 package allows software designers to utilize the multiuser, multitasking capabilities and software management facilities of the VAX-11 minicomputer while maintaining Intel Corp. compatibility. Code developed under the system can be downloaded to either Intel's In-Circuit Emulator (ICE) or a Tektronix, Inc. 8540 integration unit for emulation.

The package includes a structured macro assembler that supports the Intel macro processing language and code macro facility, a linker that supports incremental linking, a locator that formats the object code into compatible absolute code with optional symbolic debug information and an object code librarian that provides library management for the object code modules.

A license-only fee for use of the REX-SMA/186 package starts at \$4,000.

Systems & Software, 3303 Harbor Blvd., C-11, Costa Mesa, Calif. 92626.

**APPLICATION PACKAGES****J.L. HAM & ASSOCIATES, INC.**  
**Business Planning and Modeling**

J.L. Ham & Associates, Inc. has introduced the Business Planning and Modeling package for the IBM System/38.

The program reportedly includes a line number and account number structure that allows for an unlimited number of lines within a model. Projections can be made for up to 65 periods, a vendor spokesman said.

Other features included in the package are preprogrammed calculation functions, the capability for unlimited reference to lines in the model, a report generator and on-line display of data.

The package is priced at \$4,000 per site, including source code.

J.L. Ham & Associates, Maple Professional Building, 693 Maple St., Plymouth, Mich. 48170.

**GRAPHICS CONCEPTS, INC.**  
**Infograp Release 3.0**

Graphics Concepts, Inc. has announced Infograph Release 3.0 of its business graphics software.

The enhanced software is capable of generating gantt charts (which monitor progress of certain tasks), step charts, star charts and scattergrams, as well as line graphs, bar charts and pie charts, according to the vendor.

Also included in the enhanced version are graphics primitives or shapes, which can generate logos and diagrams and can be used for computer-aided design and manufacturing. See **PACKAGES** page 43

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For the name of your nearest authorized dBASE III dealer, contact Ashton-Tate, 10150 West Jefferson Boulevard, Culver City, CA 90230. (800) 437-4329, ext. 333. In Colorado, (303) 799-4900.

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NATURAL is Software AG's fourth-generation information processing system—a tool that provides the productivity needed in a place where people are the most priceless resource of all. One NATURAL programmer can typically do the work of 10 to 20 COBOL programmers.

NET-WORK is the distributed processing software that allows Alaska's officials to manipulate data from

multiple systems hundreds of miles apart—without having to worry about which location has what data.

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## SOFTWARE &amp; SERVICES

## PACKAGES from page 41

ing applications.

Initially implemented on Prime Computer, Inc. processors under the Primos operating system, Infograf is now also available on Digital Equipment Corp.'s VAX-11 minis using the VMS 2.0 operating system. It is also available on Harris Corp. processors under the VPS operating system.

The price for a 25-year license for Infograf Version 3.0 is \$9,800.

*Graphics Concepts, 6797 N. High St., Worthington, Ohio 43085.*

COMPUTER GUIDANCE CORP.  
Construction Management System

Computer Guidance Corp. has announced that its Construction Management System (CMS) software modules are compatible with the IBM System/36 Model 5362. CMS had previously been compatible with IBM System/34 and System/36.

Applications modules available on CMS include accounts payable, accounts receivable, construction payroll, construction purchasing, inventory control, job costing, equipment accounting, general ledger and time and materials billing, according to the vendor.

Prices range from \$2,000 to \$5,000 per module, the vendor said.

*Computer Guidance, 2301 E. Shea Blvd., Phoenix, Ariz. 85028.*

MCDONNELL DOUGLAS  
AUTOMATION CO.  
General Drafting System

McDonnell Douglas Automation Co. (McAuto) has announced additions to its General Drafting System (GDS), including solids and color shading; two hard-copy devices; and separate drawing and creation menus, symbol libraries and associated macros for architectural, electrical, mechanical and structural applications.

The solids and color-shading module generates three-dimensional scenes on a Tektronix, Inc. Model 4115 color terminal from a two-dimensional drawing. Prices for the solids and color-shading module begin at \$6,000 for use on Prime Computer, Inc. and Digital Equipment Corp. 32-bit computers. The architectural, electrical, mechanical and structural application menus are priced at \$1,000 each or \$2,500 for all four, according to the vendor.

Two additional hard copiers are offered by McAuto with the GDS system — the Tektronix Model 4691 color ink-jet unit, priced at \$13,650; and the Tektronix Model 4634 thermal unit, priced at \$9,600.

Prices for the turnkey GDS system range from \$100,000 to \$400,000, the vendor said.

*McDonnell Douglas Automation, P.O. Box 516, St. Louis, Mo. 63166*

INTERLEAF, INC.  
OPS-2000

Interleaf, Inc. has announced that it will offer its Office Publishing System-2000 (OPS-2000) integrated text and graphics processing software and two laser printers to users of Apollo Computer, Inc.'s Domain.

The OPS-2000 package reportedly provides on-screen text and graphics imaging and output that is camera-ready for production. The OPS-2000 package has applications in production of client specifications, manage-

ment reports, contracts and technical manuals, the vendor said.

Among the package's graphics functions reportedly are data-driven business charts and diagramming capabilities.

Interleaf's laser printers are also offered for the Domain system, including a 240 dot/in. resolution model, priced at \$28,000, and a 300 dot/in. resolution model, priced at \$14,500.

OPS-2000 is priced at \$8,000 for the first copy and \$3,000 for each additional copy.

*Interleaf, 1100 Massachusetts Ave., Cambridge, Mass. 02138.*

UNIQ DIGITAL TECHNOLOGIES  
Spider II

Uniq Digital Technologies has in-

troduced the Spider II Manufacturing Resource Planning System, an integrated manufacturing and accounting software package developed by Minicomputer Business Applications, Inc. (MBA). Uniq is licensed to sell the MBA package.

The software was designed for use with AT&T Information System, Inc.'s Unix System V Release II operating system and Digital Equipment Corp.'s VAX-11 superminicomputers.

Spider II modules include inventory control, material requirements planning, custom order processing, standard product costing, job costing and shop floor control.

The price for Spider II ranges from \$3,000 to \$7,500, depending on the modules purchased, the vendor said.

*Uniq Digital Technologies, 28 S. Water St., Batavia, Ill. 60510*

CIE SYSTEMS, INC.  
Med/680

CIE Systems, Inc. has announced a medical practice software package, called Med/680, for its Model 680 microcomputer systems. The software is reportedly transportable to any system that supports CIE's Pro-IV applications processor, including the IBM Personal Computer XT.

Med/680 is said to offer physicians immediate patient information updates and reporting capabilities, and it links treatment and procedural information to an accounts receivable and third-party billing system. It is compatible with CIE's Accountant/680 general accounting, sales analysis and inventory control package.

The Med/680 software reportedly

Continued on page 44



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## SOFTWARE &amp; SERVICES

## Continued from page 43

includes a text processor that allows generation of insurance claims, patient recall notices, appointment reminders, account dunning notices and billing statements. It also provides accounting tools such as daily activity reports by physician or by the entire practice, insurance carrier accounts receivable, responsible-party accounts receivable and cash-flow analysis.

Med/680 is priced at \$2,800.

CIE Systems, 2515 McCabe Way, Irvine, Calif. 92713.

**BAKCO DATA, INC.**

**Accounts Receivable Application Release 4.2**

Bakco Data, Inc. has announced enhancements to its Hewlett-Packard Corp. HP 3000-based Accounts Receivable Application.

Among the features of Release 4.2 is the capacity to enter collection messages into the computer under either the invoice number or customer name and print the messages on the aged-trial balance, but not on the statements. The software reportedly also permits credit checking by both credit limit and past due status of account.

The package is priced at \$9,800, with documentation and support.

Bakco Data, Suite 190, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

**PBL ASSOCIATES**

**PBL Inventory Accounting and Management**

PBL Associates has announced the PBL Inventory Accounting and Management software system for on-line control in multiwarehouse, multiuser environments.

Security controls reportedly give each operator access only to management-determined functions, and a built-in Help system provides on-line documentation. The package runs on Tandem Computers, Inc. hardware under Tandem's Guardian operating system.

The price of the package is \$50,000, the vendor said.

PBL Associates, 10 Cottage Ave., Point Richmond, Calif. 94801.

**KEY SOFTWARE, INC.**

**Keysoft Restaurant Management System**

Key Software, Inc. has introduced a restaurant management software package for the IBM System/34 and 36.

The Keysoft Restaurant Management System contains three interactive modules. The menu analysis module reportedly is designed to examine the ingredient food cost associated with each menu selection and provide automatic recosting and repricing. A payroll module enables the user to meet Internal Revenue Ser-

vice income tax reporting requirements and to perform automatic calculation of overtime and holiday pay.

The purchasing module reportedly provides on-line purchase order generation and transfer of items between stores. It also provides automatic tracking of orders with cross-references of all items purchased from any one vendor, a spokesman said. A one-time license costs \$15,000.

Key Software, 20212 Redwood Road, Castro Valley, Calif. 94546.

**WORD MANAGEMENT, INC.**

**Softword**

Word Management, Inc. has introduced a word processing package for the IBM System/36.

Softword is said to break text automatically into correct-length lines. The user can insert or delete any amount of text, a spokesman said.

The package features the ability to insert data from existing System/36 files into a master letter or document, according to the vendor.

The program's print programs reportedly include the capability to print multiple copies, line numbers and selected pages of a document.

The program is priced at \$500, the vendor said.

Word Management, P.O. Box 12068, 535 E. Clemmons Road, Winston-Salem, N.C. 27117.

**ABC MANAGEMENT**

**SYSTEMS, INC.**

**ABC/MM**

ABC Management Systems, Inc. has announced a version of its ABC/MM Maintenance Management package for Honeywell, Inc. Level 6 mini-computers.

According to a vendor spokesman, the package is designed for use by manufacturing, processing, utility, gas and oil, transport and industrial, public works, school and hospital facilities.

The package is said to combine a common data base and eight integrated modules that are available separately.

The spokesman said the modules accommodate labor records, time cards, work-order scheduling to available capacity, job estimates, backlog planning, time and accounting performance control, budget control, equipment history, parts and inventory and preventative maintenance.

The system requires a minimum 64K bytes of memory, according to the spokesman.

ABC/MM is priced between \$11,000 and \$65,000, depending on the number of modules chosen, the vendor said.

ABC Management Systems, Suite 3, 805 Dupont St., Bellingham, Wash. 98225.

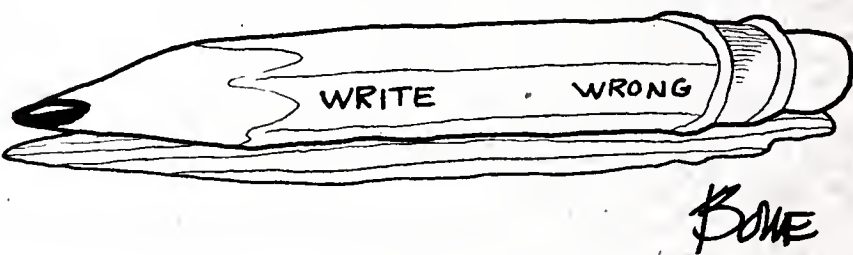
**MPG** from page 37

IBM Personal Computer using MPG's Ramlink or from any IBM 3270 or compatible terminal. It is available in all major IBM mainframe interactive environments. Prototypes will be available in June at prices ranging from \$4,500 to \$9,000, with production systems slated for shipment in

the fall.

MPG also said it would now offer the IT series of micro software from Itsoftware, a subsidiary of Martin Marietta Data Systems, Inc. The products are available at prices ranging from \$150 to \$500.

Mathematica Products Group can be reached through P.O. Box 2392, Princeton, N.J. 08540.



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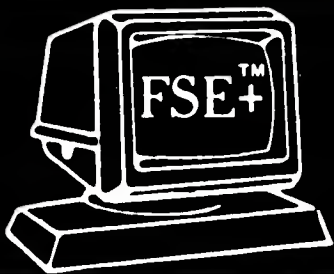
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## SOFTWARE &amp; SERVICES

## LANGUAGES

**RYAN-MCFARLAND, INC.**  
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Ryan-McFarland, Inc. has announced that it will provide its RM/Cobol Version 2 language for use on the AWS Turbo, IWS and Ngen microcomputer systems produced by Convergent Technologies, Inc.

RM/Cobol is used to develop and execute Cobol business applications and is said to be portable. RM/Cobol Version 2 reportedly offers improved duplicate-keys handling, locked-when-open file protection for multiuser environments and binary or line-sequential options.

Prices for RM/Cobol on Convergent Technologies computers are: \$750 for use on 8-bit machines; \$950 for 16-bit machines; and \$1,250 for Unix-based machines.

Ryan-McFarland, 609 Deep Valley Drive, Rolling Hills Estates, Calif. 90274.

## ON-LINE DATA BASES

**INDEPENDENT COMPUTER CONSULTANTS ASSOCIATION**  
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The Independent Computer Consultants Association has announced that its directory of independent consultants is now on-line with the videotex data base offered by Compuserve, Inc.

The directory is available through Compuserve's information service subject index, which is cross-indexed by skills reference and location of the consultants, according to a spokesman for the association.

The price for the directory for association members will be \$35.

That price does not include telephone charges, according to the Independent Computer Consultants Association spokesman.

Independent Computer Consultants Association, P.O. Box 27412, St. Louis, Mo. 63141.

## UNIX from page 37

to its microprocessors to provide software portability across microprocessor implementations. Motorola reportedly is the first of the four companies to complete its porting of System V for AT&T.

Unix System V/M68000 will make that version of Unix available across the range of microcomputers that employ the 68000 microprocessor. The spokesman said System V/M68000, which is scheduled to be offered in source code under license from AT&T at the end of this month, is targeted to resellers developing products for Unix System V.

The System V version of Unix is a multitasking, multiuser environment that combines the Unix operating system with built-in utility programs, such as electronic mail, and software development tools for applications development. It is written almost exclusively in the high-level C language to provide transportability across computer systems.

Unix System V/M68000 will be offered on hard disk cartridge for Motorola's Exormacs micro and on nine-track tapes for AT&T's 3B20 line of minicomputers. It will cost \$43,000 for the initial CPU and \$16,000 for each additional CPU.

In conjunction with the introduction of Unix System V/M68000, AT&T Technologies also announced the Cobol Syntax Checker package. Operating under Unix System V, the package reportedly is designed to improve the efficiency of Cobol applications development by allowing programmers to edit and check the syntax of Cobol programs before they are transmitted to a CPU for compilation and execution.

AT&T's Cobol Syntax Checker is currently available in source code under license at \$7,500 for the first CPU and \$3,750 for each additional CPU. It is also available on tape media for AT&T's 3B20 line.

AT&T Software Sales and Marketing can be reached through P.O. Box 25000, Greensboro, N.C. 27420.

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## CODE from page 37

people are afraid to discuss it. Vendors of systems software state privately that object code only could impose dramatic restraints on their ability to support their products. Publicly, however, they are almost nonchalant about the issue.

Users seem more willing to discuss the practice, but even they express fear of retaliation. A white paper prepared at the request of the Share users group has recently made its way into the hands of the trade press. The paper is thoughtfully presented and portrays what appear to be real concerns of the IBM user community.

Share, however, has refused to support any aspect of the document. In fact, a spokesman dismissed the paper's 41 recommendations almost flippantly, saying they may reflect no more than the opinions of its two authors. The authors, on the other hand, claim that the paper is based on interviews with about 100 users.

Admittedly, the press is not the appropriate place to carry out an exhaustive discussion of every facet of this sensitive topic. Certain things are better left to private negotiations. But it is disturbing to see that the IBM user community is so frightened by the object-code-only issue. Is IBM perceived as such a tyrannical force that the mere thought of retribution inspires panic among its customers?

IBM did not become the industry leader by ignoring the concerns of its customers. Nor is it likely to stoop to retaliation against users who make legitimate fears known. But to deny that a conflict exists when publicly available materials suggest otherwise is to do a disservice to those users who are bold enough to speak their minds.

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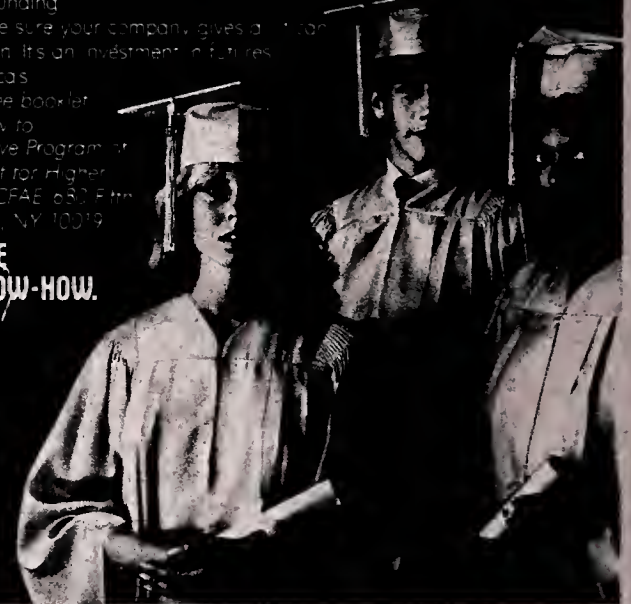
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## SOFTWARE &amp; SERVICES

**GUARD** from page 37

CPU should be regulated by a key lock, not an on-off switch. This will ensure that start-ups can be initiated by authorized personnel only.

■ Segregate responsibilities for system design, operation and entry. Ideally, the people who design and program your computer should not be the same people who operate it on a day-to-day basis. Likewise, machine operators should not be functioning at the data entry level.

■ Segregate terminal functions. Systems can be designed so that each terminal is assigned a specific operation. In this way, an employee working at a customer service station has no way of tapping into accounting or other functions.

■ Define your terminal network. Program your system to respond only to those terminals that are part of your system. Thus, any unauthorized terminals will not be recognized or accepted by the system.

■ Protect password integrity. Prevent visual eavesdropping by designing your system so that passwords do not appear on the screen when entered. It is also a good idea to change each operator's password at least once or twice a month.

Insist that operators commit their passwords to memory. Written words are easily stolen. And immediately void passwords whenever an employee leaves the company.

■ Assign single responsibility for key and password security. This way, should a breach occur, responsibility is easier to determine.

■ Safeguard telephone links. They are the hacker's favorite form of entry. There are encryption devices available that make telephone communication with a computer impossible without a compatible device on your end. Also, as with passwords, it's a good policy to

change access phone numbers on a regular basis.

■ Program your system to flag transactions that vary from an established norm, such as the issuance of an abnormally high credit voucher. Such watchdog programs not only protect against premeditated embezzlement, but also catch legitimate mistakes and entry errors.

■ Secure lists of all inactive or dormant accounts. A favorite computer fraud

scheme involves minor tamperings with these accounts. The fewer people who know about their existence, the safer they are likely to be.

■ Keep records of each operator's transactions. Through such transaction logging, it is easier to trace the source of problems should they occur.

■ Copy all transaction records. Copy all master files at least twice. Keep one on the premises, the others in a

secure location off-site. This will protect your continuity in case of physical disaster.

■ Limit periods of system activity. Restrict the operation of your communications links to those times when user activity is anticipated. If you do business strictly from 9 a.m. to 5 p.m., your system should not be accepting entries at 2 a.m.

■ Restrict access to program libraries. The heart of your system's operations

should be restricted to those individuals responsible for programming functions. In addition, any changes made in the library should be tested by someone other than the programmer who made the alterations.

■ Use an experienced systems designer/programmer. Select the company that designs and programs your billing system based on its experience in your particular field.



## C.ITOH ELECTRONICS HAS SOME NEW IDEAS ABOUT DOING BUSINESS IN THE WORLD.

**PCSS** from page 37

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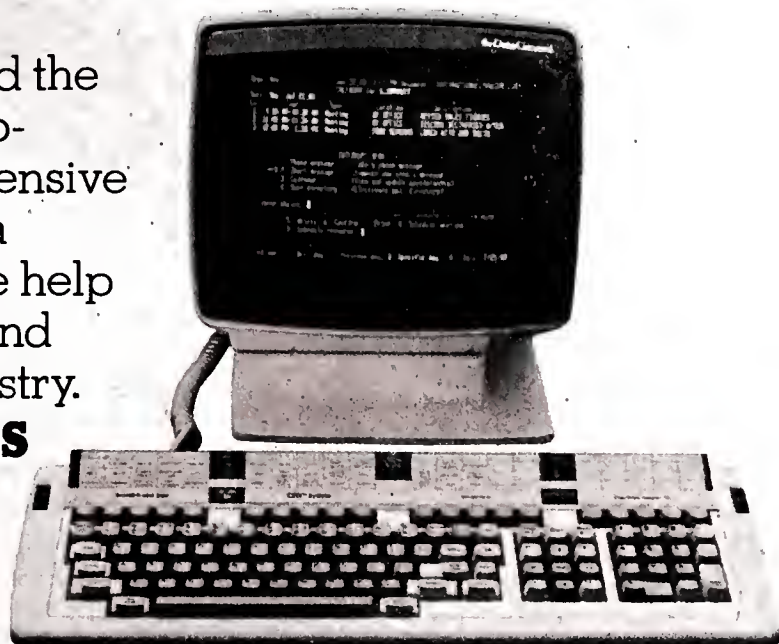
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# COMMUNICATIONS



**DATA STREAM**  
Lynn Haber  
CW staff

## Bill may be more a bane than a boon

A bill recently introduced in the U.S. Senate by Sen. Jack Danforth (R-Mo.) aimed at bolstering the U.S. telecommunications industry's stance in world markets may be more of a bane than a boon, industry watchers recently indicated to *Computerworld* [CW, May 7].

The gist of the legislation is to establish a three-year timetable for negotiations between the U.S. and foreign nations. If no agreements were reached by that time, the U.S. would impose increased import tariffs on telecommunications equipment (already increased because of the AT&T divestiture) from 5% to 15% to 35%.

The bill is primarily aimed at Japan and is based on a growing fear in the Capitol that the Japanese are going to come to dominate areas of the telecommunications equipment market. According to Dr. Alan Pearce of Information Age Economics, many major U.S. manufacturers specifically fear Japanese domination of Customer Premises Equipment (CPE) and cellular radio equipment. In CPE, mostly telephone handsets and private branch exchanges, imports from Japan rose by 300% between 1982 and 1983, according to Pearce.

"The objective of this bill is basically simple," Stephen Cohen, director of the Berkeley Roundtable on the International Economy, explained. "We [made] the all-time dumb trade move by opening the U.S. market to foreign competitors in telecommunications, never even thinking of demanding reciprocal treatment, and [the bill] is an after-the-fact, 'Oh, gee whiz.'"

The implementation of political pressure to do business with U.S. firms may

See **BILL** page 57

## Net standards seen up in air

### Much of the work still lies ahead

By Phil Hirsch  
CW Washington Bureau

LAS VEGAS — Despite some progress in standardizing local-area networks, much confusion remains — and it is likely to persist, Charles Bass indicated here at the International Communications Association's recent annual conference.

Bass, president of Ungermann-Bass, Inc., a major local-area network vendor, said the biggest part of the local-area network standardization chore lies ahead. Only two of the seven protocols that have to be defined before communications among local-area networks and users can be considered fully standardized have been defined so far.

Bass added that since the protocols remaining to be specified involve a greater number of options than their predecessors, they are apt to be even more controversial.

Before work on the standards that have been agreed upon was completed, the standards sparked prolonged, often acrimonious, battles. One involved the merits of broadband vs. baseband transmission, and

another pitted contention-based schemes for giving terminals access to the network against those involving nonrandom methods.

The agreed-upon standards were developed by a group within the Institute of Electrical and Electronics Engineers (IEEE) called the IEEE 802 Committee; the standards relate to the lowest two layers of the "ISO Reference Model," Bass explained.

The two layers in the seven-layer model developed by the International Standards Organization (ISO), specify the mechanical/electrical functions that must be provided at the interface between a computer-based terminal and a public-switched network and the logical functions that must be included in communications headers exchanged by those terminals when connected to such networks.

The next major step in local-area network standardization, Bass said, is to develop specific protocols implementing the functions defined by the third and fourth

See **BASS** page 56

## IBM will set pace for nets: marketers

By David Myers  
CW New York Bureau

NEW YORK — "I love standards. There are so many of them to choose from," a local-area network marketer quipped here recently. But the number of those standards may have been reduced drastically by IBM's announced intention to enter the local-area network market.

Marketers who gathered here earlier this month for a two-day conference on networking were almost unanimous in agreeing that IBM will set the standard for local-area network architecture, despite the best efforts of rival manufacturers and independent governing bodies to set that standard for themselves.

"Whatever [IBM] does is going to be adopted as the standard — good, bad or indifferent," said William Taylor of Sytek, Inc., a Mountain View, Calif., supplier of

local-area nets.

The marketers and users who gathered here for Frost & Sullivan, Inc.'s two-day conference on networking personal computers were unaware of IBM's announcement, but attendees concurred that the market will probably burst into a frenzy of network building activity once an architectural standard is agreed upon.

The number of local-area network suppliers in the U.S. has jumped from 17 to 159 in just two years, conference-goers were told by Mike McNaughton, president of Franklin Lakes, N.J.-based Business Development International.

Yet despite the burgeoning number of would-be hardware suppliers, the local-area network market has been plagued by a woeful lack of applications software directly attributable to the absence of stan-

See **NETS** page 57

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## Finance firms study consumer interest in videotex services

By David Olmos  
CW Staff

A collection of 15 financial institutions in the U.S. and Canada are embarking on a major year-long study to measure consumer interest in videotex banking and information services.

Starting in mid-July, participating banks and financial institutions will lend videotex terminals to select groups of customers. These customers will be able to choose from a range of home banking and home information services.

This project is research-oriented, according to Paul Simms of Continental Illinois National Bank in Chicago, the largest U.S. bank involved in the study. "We want to find out how big a demand there is out there for home information services."

The project, called the Home Bank-

ing Interchange, is being coordinated by Automatic Data Processing, Inc.'s (ADP) Telephone Computing Services Division. The division, based in Seattle, is a third-party electronic payment service. Mathematica, Inc., a Princeton, N.J., research firm, is assisting in the project.

"This is the definitive research program in the industry today to understand consumers' interests, needs and willingness to buy," Howard Phillips, Telephone Computing Services Division president, said.

ADP has contracted with Times-Mirror Videotex Services, Inc. for its Gateway data base information service. Gateway will provide customers with news, weather, sports, business and financial reports, electronic mail, teleshopping, video games and other educational and consumer information.

Some of the participating institutions include the Bank of Montreal, Marine Midland Bank in New York, First Wisconsin National Bank, First Union Bank in North Carolina, Bank of Ohio and National City Bank in Cleveland.

### Cost to bank

Continental hopes to find out how much users would be willing to pay for such a service and the cost to the bank of a full-scale implementation, according to Simms, a second vice-president and Continental's representative on the project's advisory committee.

Continental has purchased AT&T Sceptre terminals for a randomly selected group of 75 checking account customers, Simms said. Those customers will be able to choose from such banking services as bill pay-

ment, funds transfer, account histories, balance inquiries and other bank information, as well as the Gateway service.

"It's a year-long test, which we feel is very important because it gets over something called the 'novelty effect,' in which the customer plays around with the terminals for one, two or three months" and then becomes disinterested, Simms said. "What we want to find out is what the usage is after that point."

Although the terminals will be provided free of charge, Continental's customers will pay a \$7.50 fixed monthly charge for the service. After six months, however, a usage fee will be levied. The purpose of the usage charge is to measure elasticity of demand for the services, Simms explained.

See **BANK** page 56



## COMMUNICATIONS

# United Telecom sets Ill. rail easement pact

KANSAS CITY, Mo. — United Telecom Communications, Inc., a subsidiary of United Telecommunications, Inc., announced last week that it has completed an agreement with Illinois Central Gulf Railroad for the acquisition of approximately 850 miles of easements for the construction of portions

of the communications company's \$2 billion nationwide long-distance telephone network [CW, May 7].

The agreement gives United a renewable 25-year lease on a route connecting Chicago and East St. Louis, Ill., and an option to acquire additional easements from Illinois Central Gulf on several

routes in an area between Chicago and New Orleans, according to William T. Esrey, United Telecom president.

Terms of the cash transaction were not disclosed.

The telephone system is scheduled for completion by 1987.

Preliminary engineering

activities for the Chicago-East St. Louis route have begun, and site engineering work was scheduled to begin last week, according to Esrey.

Construction is expected to begin in July, and Esrey said he expects to be moving traffic on it by the end of the year.

## VOICE/DATA COMMUNICATIONS

### LIGHTWAVE COMMUNICATIONS, INC. Multimux 1000

Lightwave Communications, Inc. has introduced the Multimux 1000, a 10-channel, modular time division fiber-optic multiplexer.

The product reportedly is compatible with RS-232 and RS-422 interfaces and, with the selection of an appropriate slide-in circuit card, can also support analog. The multiplexer transmits at speeds up to 19.2K bit/sec over distances up to two kilometers.

The price is \$1,175.

Lightwave Communications, 650 Danbury Road, Ridgefield, Conn. 06877.

### ARTEL COMMUNICATIONS CORP.

#### CG203 Graphics System

Artel Communications Corp. has introduced the CG203 Graphics System, a fiber-optic computer graphics communications system.

The system consists of two transmit and receive modems (CG203T and CG203R) that allow a graphics controller and monitor/keyboard to communicate high-resolution RS-343A video and simultaneous dual, bidirectional RS-232C digital data signals over a single fiber-optic cable, according to a vendor spokesman.

The fiber-optic system bandwidth accommodates graphics display systems with up to 1,280- by 1,024-pixel resolution. Coaxial I/O connectors are plug-compatible to many monitors and display generators.

The price is \$2,000 per end.

Artel Communications, P.O. Box 100, West Side Station, Worcester, Mass. 01602.

## PROTOCOL CONVERTERS

### COMSTAT DATACOMM CORP.

#### C8800 Statistical Concentrator

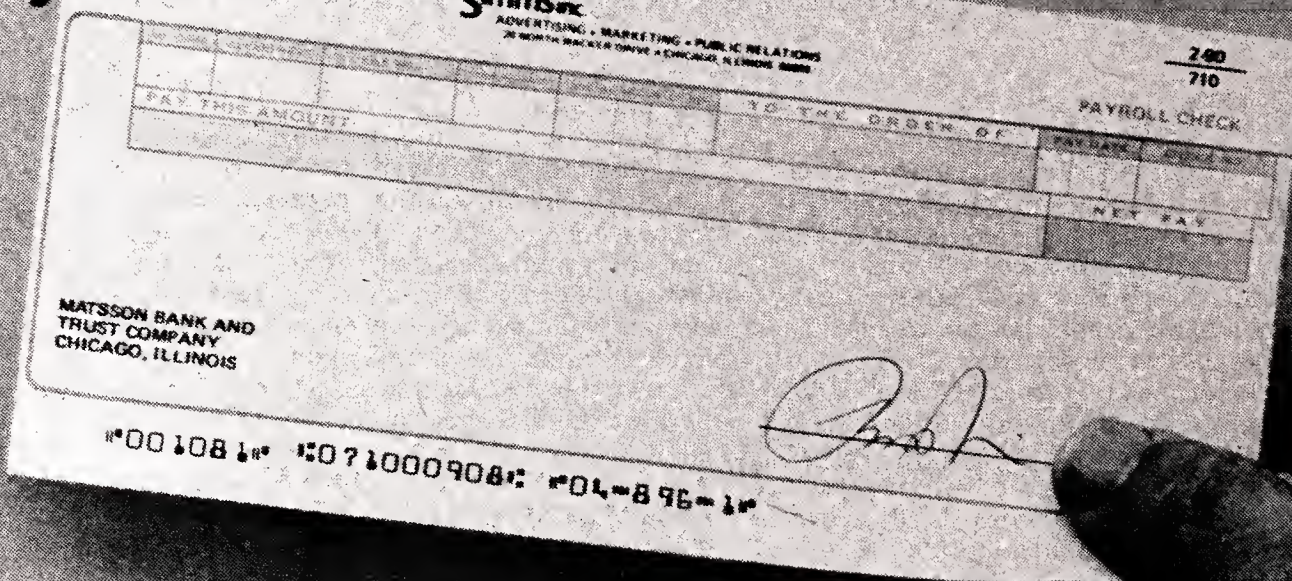
Comstat Datacomm Corp. has announced the C8800 Statistical Concentrator for Burroughs Corp.'s Data Communication Protocol Networks.

The product is a micro front-end processor and converter that is connected between a Burroughs mainframe and poll-select network devices such as terminals or modems, the vendor said.

The C8800 performs conversions between synchronous, asynchronous and isosynchronous protocols, including asynchronous two-wire direct interconnect, ac-

Continued on page 54

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With the 3864, you can access up to 560 pages per second at a transfer rate of up to 4 megabytes per second—which is two to three times more efficient than its IBM disc counterpart, the 2305, and the IBM paging device, the 3880-11.

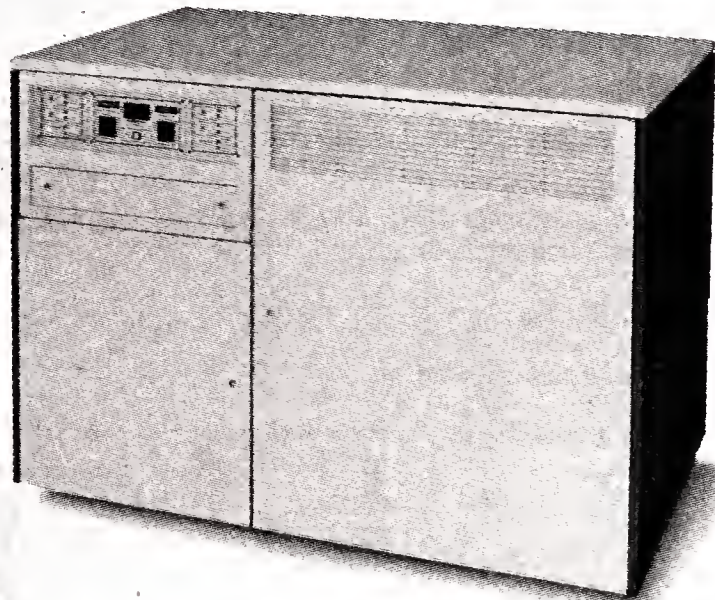
Maximum access time for the 3864 is a mere 0.4 ms, 600% faster than the 2305 and 200% faster than the 3880-11, respectively.

**Stop and think.**

With the 3864, you'll also appreciate features like a memory capacity of up to 144 megabytes—18 times the 3880-11 and 12 times the 2305.

Plus self-healing capability that automatically detects errors and substitutes good memory for faulty memory.

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WHEN IT MATTERS, MAKE IT MEMOREX.™

## MEMOREX



## COMMUNICATIONS

Continued from page 52

cording to a company spokesman.

Optional speed and data structure conversions can also be accommodated, the vendor said.

The concentrator is available in standard 8K-byte or expanded 24K-byte buffer versions, according to a vendor spokesman.

Both configurations reportedly feature poll-ahead data collection, nonvolatile parameter retention as well as internal and external synchronous clocks.

The configurations also feature dual RS-232 interfaces with complete Burroughs poll-select compatibility, the vendor said.

The price is \$1,295, the vendor said.

Comstat Datacomm, Box 1548, Lilburn, Ga. 30247.

## SOFTWARE

P.S.I. PACER SOFTWARE, INC.  
Gnet-II revision 3.0

P.S.I. Pacer Software, Inc. has announced Gnet-II, an enhanced version of the company's communications utility for use with Prime Computer, Inc.'s Primos operating system.

The new version of Gnet-II (revision 3.0) has added a line-security mechanism which is implemented under the Primos ACL subsystem. In a networking environment, the software product is said to provide a means to reserve lines, to give certain users privileged access to all lines and to forbid use of specified lines.

Some of the product features in-

clude: a symbol table that allows the product to synchronize its data transfer with remote system command and error prompts, buffer and parity control user profiles, and prime-to-prime binary file transfer. The price is \$1,500.

P.S.I. Pacer Software, 1227 Pearl St., La Jolla, Calif. 92037.

MULTIPLEXERS/  
MODEMSUNIVERSAL DATA SYSTEMS,  
INC.

Model 224

Universal Data Systems, Inc. has announced the Model 224 full-duplex 2,400 bit/sec modem.

The product is microprocessor-based and designed for asynchronous or synchronous operation over the public-switched telephone network. It will reportedly communicate with any other Western Electric Co. 212-compatible modem in the fallback mode of 1,200 bit/sec.

The modem features automatic answer, fully automatic adaptive equalization and diagnostic capabilities, according to a company spokesman. The price is \$995.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.

DRANETZ TECHNOLOGIES, INC.  
DM-C15

Dranetz Technologies, Inc. has announced the DM-C15 modem cartridge, which allows the company's Series 626 remote-monitor units to analyze power line disturbances and report results over telephone lines.

The autoanswer modem plugs into the rear panel of the remote-monitor unit to provide direct transmission of power line disturbance data at 300 bit/sec rates, the vendor said.

Models are available for single-phase ac monitoring, 3-phase ac monitoring or 3-phase ac plus dc channels. The price is \$350.

Dranetz Technologies, Computer Products Division, 1000 New Durham Road, Edison, N.J. 08818.

COHERENT COMMUNICATIONS  
SYSTEMS CORP.  
DSMT-7

Coherent Communications Systems Corp. has introduced the DSMT-7 digital speech multiplexer for 64K bit/sec digital circuits.

The product may be configured to provide either two 32K bit/sec digital voice channels or one 32K bit/sec digital voice channel plus one data channel having a maximum aggregate data rate of 28.8K bit/sec, the company reported.

The multiplexer also provides transmission of analog modem signals at data speeds up to 9,600 bit/sec. The data channel may be configured to support up to eight data channels, each operating at 2.4K, 4.8K, 9.6K or 19.2K bit/sec, provided that the aggregate speed does not exceed 28.8K bit/sec, the vendor said. The price range for a multiplexer with one voice link and one data link and interface is \$1,500 to \$3,000.

Coherent Communications Systems, 60 Commerce Drive, Hauppauge, N.Y. 11788.

LOCAL-AREA  
NETWORKSINTERLAN, INC.  
NI3210

Interlan, Inc. has introduced the NI3210, a multibus Ethernet communications controller.

The communications board reportedly provides multibus-based systems with a link-level connection to Ethernet/IEEE 802.3-type local-area networks. The controller board is supported by Unix networking software packages from Interlan, Network Research Corp. and Unisoft System Corp.

The controller board performs specified data link and physical

Continued on page 56

# MVS Users Save 80% to 90% of your key strokes

```

----- DATASET MANAGEMENT FACILITY -----
COMMAND ==>
DATASET SELECTION: JONES

SCROLL ==> PAGE
VOLUME: *****

** TOTALS ** DATASETS 17   TRACKS: ALLOC 403   USED 211   P/C USAGE 52
C DATASET NAME   QUALIFIER: JONES   ST VOLUME DSOrg RECFM LRECL BLKSZ ALLOC
-----
***** TOP OF DATA *****
BACKUP.DMFASM..... OF 063189
CNTL..... TS0408 PO   FB       80  6160   30
CLIST..... TS0611 PO   VB     255  3120   30
DMF.ASM..... DMF001 PO   FB       80  6160  120
DMF.LOAD..... DMF001 PD   U        0 19069   15
DMFMOD1.ASM..... TS0190 PS   FB       80  6160    1
DMFMOD1.LOAD..... TS0408 PO   U        0 19069    1
d DMFMOD1.OBJ..... TS0326 PS   F        80    80    1
b LOG.MISC..... TS0611 PS   VB     251  3120    1
MODEL.FORT..... WMK501 PS   FB       80  6400    2
e SMFANAL.PLI..... WMK501 PS   VB     251  3120    3
SMF.083046..... OF 014726
SPF.LOAD..... DMF001 PO   U        0 19069    5
SPF.PANELS..... DMF001 PD   FB       80  6160   10
r TEST.DATA..... *U TS0219 PS   FB       80  4000  150
TEXT..... TS0408 PO   VB     255  6200   30
TSOUSE.PLI..... TS0326 PS   VB     251  3120    4
***** BOTTOM OF DATA *****

```

\* Up to 36 lines of file information plus scrolling

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- VTOC and catalogue information in one display.
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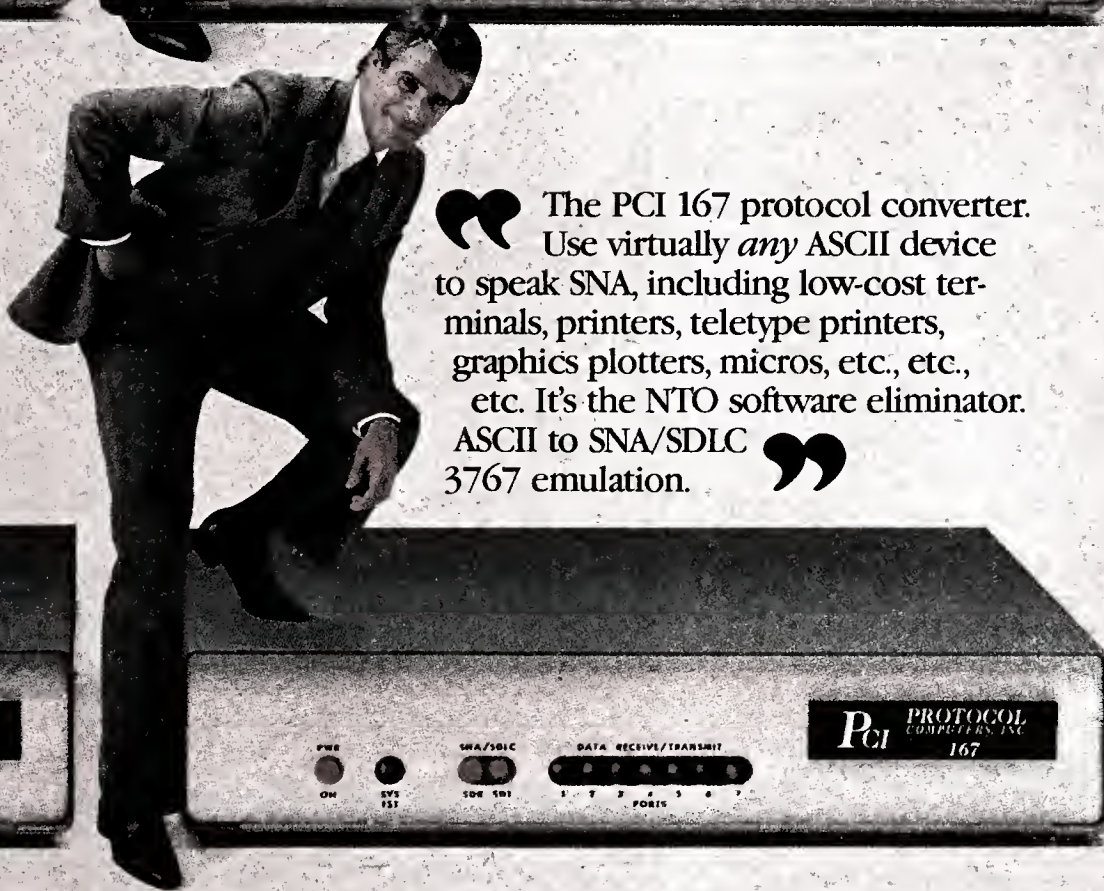
“ The PCI 151 protocol converter. Permits a wide variety of PCs and non-IBM ASCII terminals to talk with an IBM System 34, 36 or 38. Speak by way of direct connection, or via modem – either point-to-point or multi-dropped. ASCII to System 34/36/38 5251 emulation. ”



“ The PCI 171 protocol converter. Designed for companies who want to use ASCII devices to communicate in an IBM Bisync environment. ASCII to BSC 3270 emulation for non-SNA applications. ”



“ The PCI 167 protocol converter. Use virtually *any* ASCII device to speak SNA, including low-cost terminals, printers, teletype printers, graphics plotters, micros, etc., etc., etc. It's the NTO software eliminator. ASCII to SNA/SDLC 3767 emulation. ”



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## COMMUNICATIONS

Continued from page 54

channel functions, permitting 10M bit/sec data communications between stations separated by up to 2,500 meters, the vendor said. The product also offers network diagnostic tools such as internal and external loopback modes. The controller is priced at \$1,290.

*Interlan, 3 Lyberty Way, Westford, Mass. 01886.*

## AUXILIARY EQUIPMENT

## INTEGRATED APPLICATIONS, INC. Entercept

Integrated Applications, Inc. has announced Entercept, a data security device that reportedly prevents unauthorized internal and external access to computers on asynchronous communications lines. The device is installed between the computer and the modem for outside intruders or between the computer and terminal for internal protection.

Communications with the computer can be gained only by knowing the six-character access combination that is set inside Entercept. The price is \$595.

*Integrated Applications, 8600 Harvard Ave., Cleveland, Ohio 44105.*

## INTEGRATED APPLICATIONS, INC. Mediator

Integrated Applications, Inc. has introduced the Mediator, a serial and parallel port adapter.

The product reportedly provides parallel-to-serial, serial-to-parallel and serial-to-serial data conversions. In serial-to-serial operations, bit/sec rate, flow control and character length can be controlled.

The price is \$349, the vendor said.

*Integrated Applications, 8600 Harvard Ave., Cleveland, Ohio 44105.*

## BANK from page 51

Simms said the future of electronic home banking will depend on how broad the market is — a question the trial test is intended to answer. "If you only have 5% of your customers signing up for this type of service, you really can't change the way you operate," Simms said. He estimated that 30% to 50% of a bank's customers would need to take part for a significant savings to result.

"From a technological viewpoint, as well as a business viewpoint, things are moving ahead very rapidly, and we don't want to make a commitment just yet," Simms said.

Some banks are already

testing the videotex waters, with an eye toward the potential cost savings of reduced paper transaction handling, staff and facilities.

Earlier this month, Bank of America introduced its Personal Homebanking service to customers in Southern California. The bank's service, which can be accessed by virtually any kind of microcomputer, is already used by about 8,000 customers in Northern California.

## BASS from page 51

layers of the ISO reference model. This is proving to be difficult because the companies that cooperatively developed the lower level standards are implementing proprietary protocols to carry out the higher level functions.

The National Bureau of Standards (NBS) has developed protocols for the third and fourth layers of the ISO

model and has announced that it will do likewise for the fifth, sixth and seventh layers, Bass explained. He believes, however, that the bureau has increased rather than decreased the present confusion.

If NBS can get its protocol adopted as an international standard, the confusion probably will be reduced, Bass added. Ultimately, a small number of proprietary upper layer local-area net-

work protocols will become de facto standards, according to Bass.

Xerox Corp.'s XNS, Digital Equipment Corp.'s Decnet, IBM's Systems Network Architecture and the NBS protocol are likely candidates, Bass said.

But Bass made it clear that this shakeout will take time. Until then, the local net user's freedom to communicate with "foreign" terminals and nets will be severely limited.

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NEC's Advanced Personal Computer offers the sharpest color graphics of any personal computer.

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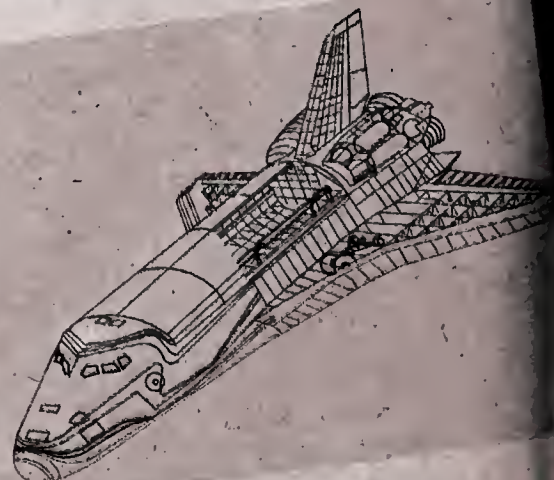
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Then, unlike other PC's, the



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## COMMUNICATIONS

**BILL** from page 51

not be good business. Industry analysts have raised the following issues:

■ U.S. manufacturing firms with offshore plants could potentially be subject to tariff increases under the proposed legislation.

■ Equipment contracts already under way with other countries may be jeopardized in response to this type of legislation.

■ With the absence of lower priced products, the consumer may end up paying higher prices for telecommunications equipment.

■ There is the potential for retaliatory action by other countries to this legislation.

On the other side of the coin, genuine concerns for the need for legislation such as this have also been raised. First, there is a need to stop the potential dumping of

poor-quality foreign products on the U.S. market at very low costs to consumers. Second, there is an attraction to labor that protection of U.S. industry will generate a certain level of stability.

While the existence of a fair competitive environment between nations is important, the U.S. should guard against using strong-arm tactics, because should the ax fall, the head it falls on may be its own.

**NETS** from page 51

dards, according to Surinder Brar, vice-president at North Star Computers, Inc. in San Leandro, Calif. IBM's endorsement of token-passing architecture should spur development of multiuser applications, Brar said.

"Once a standard is adopted, the biggest problem will be software integration. That will take a while [to solve], because at this point, there

are too many vendors solving too many problems," Victor J. Tarasov, district manager at AT&T Information Systems, said. Tarasov promised that "something is coming up in short order" from AT&T on the local-area network front, but beyond that, he would not comment.

**Apple's position**

Apple Computer, Inc. has decided against entering the local-area sweepstakes because of its inability "to set a standard in networks. We're not big enough. Only IBM or AT&T is big enough to do that," said Randy Battat, an Apple marketer from the company's Boston district office.

In the meantime, Apple has developed a bus communications link that enables up to 32 of its Macintosh computers to tie together at a cost of around \$50 per machine.

"Until there is a single standard for tying everything together, the key is to get people to start experimenting with this technology. We wanted to give [users] something cheap enough that they could throw [it] out and not lose anything once the standard [local-area network] is adopted, giving them a growth path," Battat explained.

IBM's admission that it will take up to three years for the company to get a full-fledged local-area network onto the market, gives firms like North Star and Convergent Technologies, Inc., which have been pushing the cluster concept, a two- to three-year window through which to sneak their installations into U.S. offices.

Network marketers warned users, however, that the decision of which local-area network to install ends up determining which brands of computer hardware can follow it into the office.

"The network is becoming the permanent installation. Once installed, it becomes the standard for choosing what equipment you're going to buy," Sytek's Taylor said.

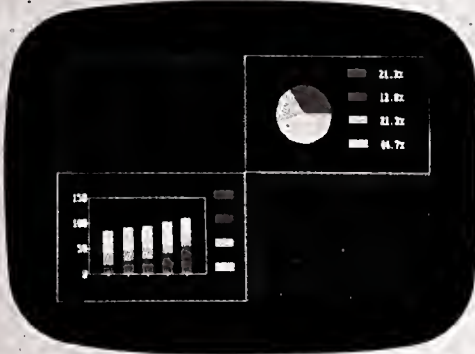
**Heart of techniques**

Ultimately, that decision affects more than a company's purchasing strategy. It goes to the very heart of a company's resource management techniques, according to Alan J. Malinger, senior manager of communications product marketing at Data-point Corp.

"Those resources [computers and peripherals] are the minor resources of an organization. If you lose your printer, what do you do? You keep working.

"But information is an organization's most important resource," Malinger maintained. "If you lose your information or if it becomes bastardized, what do you do? You shut down."

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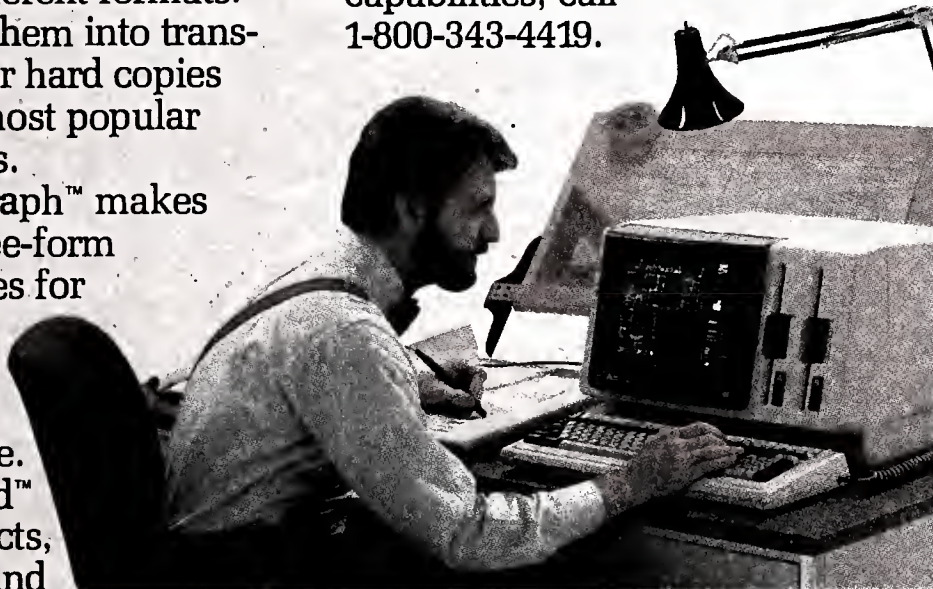
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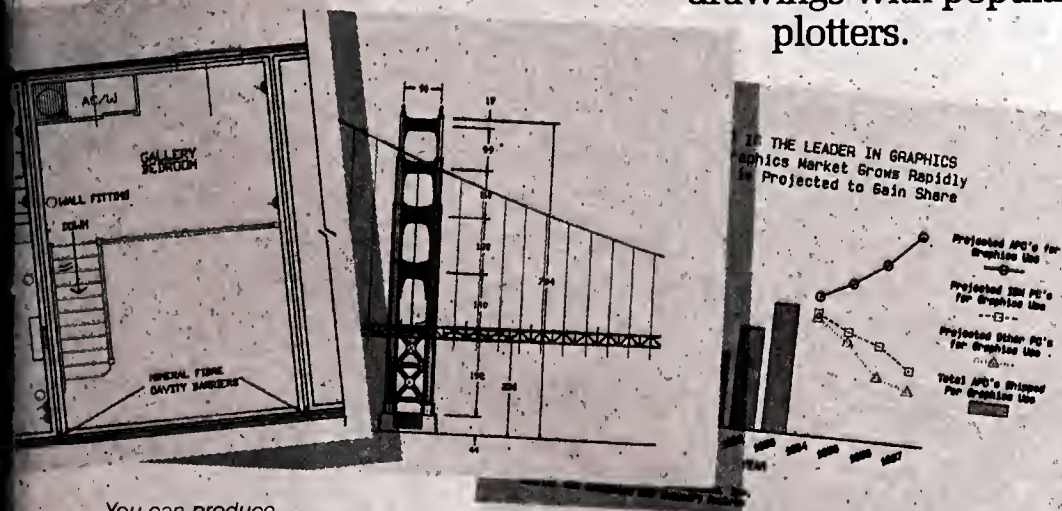
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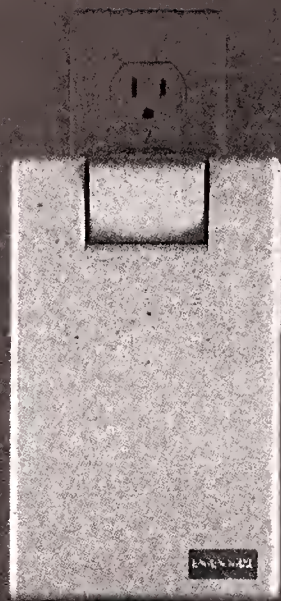
Communication is simpler too, because we let you switch back and forth between voice and data on the same line. That way, you don't have to hang up and re-dial just to find out if somebody got what you sent.

Our POPCOM X-100 automatically adapts to the interface cable on your computer, which means you don't have to know what kind of RS-232 interface you have. And our X-100 transmits at the fast, economical 1200 bps rate as well as the standard 300 bps.

The POPCOM X-100 uses the most popular software communications packages available today.

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1. Plug the modem into a power source.
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3. Plug the modem into the computer.
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5. Plug the phone into the modem.

NOTE: THE POPCOM MODEL X-100 ONLY COSTS \$475.

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6. Set the eight binary switches (consult your manual for details).
7. Carefully close the case.
8. Plug the telephone line into the modem.
9. Plug the modem into the computer.
10. Turn on the computer.

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## MODEMS

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# SYSTEMS & PERIPHERALS

## Gould Powerseries gets low-end addition

By James Connolly  
CW Staff

FORT LAUDERDALE, Fla. — Gould, Inc.'s Computer Systems Division has announced a virtual memory, Unix-based, entry-level addition to its Powerseries family of distributed systems.

The Powerstation 2000 is designed to provide commercial users with a 4M-byte virtual memory system utilizing Gould's UTX/2000, which is based upon Bell Laboratories' Unix System V. According to Gould, the system is the first application of demand-paged virtual memory on a low-cost, Unix-based system.

The 32-bit Powerstation 2000 is said to support up to eight users in a data processing installation. It features a Motorola, Inc. 68010 microprocessor operating at 10 MHz. Memory is provided in 512K-byte increments, with a maximum physical memory of 2M bytes and a virtual memory of 4M bytes. The demand-paged virtual memory has been available previously only on minicomputers and mainframes.

Gould claimed that the Powerstation 2000 offers roughly the  
See **GOULD** page 73

## Nohalt announces 16-bit Reliant system

By Tom Henkel  
CW Staff

FARMINGDALE, N.Y. — Nohalt Computers, a division of TPC Logistics Services, Inc., has announced a 16-bit version of its Reliant fault-tolerant computer system.

Designed for transaction processing applications, such as hotel and airline reservation systems and critical banking applications, the system is capable of accommodating up to 16 Intel Corp. 8086 microprocessor-based application processors. The vendor claims the Reliant system can offer internal performance of up to 5 million instructions per second.

Current users of the 8-bit version of the Reliant system (which uses Zilog, Inc.'s Z80 microprocessor-based application processors) can also install the 16-bit processor boards into existing system backplanes. The newly announced 16-bit CPUs use the same proprietary NH-DOS operating system developed by Nohalt for the 8-bit version of the Reliant system. Users can have mixed configurations of 8- and 16-bit application processors, a company  
See **HALT** page 76

■ Spartacus Computers, Inc. has bailed out of the IBM-compatible processor business. The firm said it will focus on marketing IBM-compatible communications products/60

■ Digital Engineering, Inc. unveiled its first complete workstations. The two units boast performance 10 to 50 times greater than the firm's earlier board-level enhancements for Digital Equipment Corp. terminals/60

■ Sentinel Computer Corp. replaced its line of 16-bit minicomputers with new 16-bit systems based on Intel Corp.'s 8086 and 186 microprocessors/60

## Smaller systems solving users' problems, micro meet told



### CW AT MICROGUIDE '84

By Robert Batt  
CW West Coast Bureau

SAN FRANCISCO — Users are looking more and more to smaller systems to solve their information processing needs at the expense of traditional mainframe solutions, according to William Zachmann,

vice-president of corporate research at International Data Corp. (IDC) in Framingham, Mass.

Speaking at IDC's 1984 Microguide Conference, titled "Micro Wars: Shape Up or Shake Out," Zachmann said smaller systems are increasingly being perceived as a cheaper and better solution to users' problems.

Obsolete software and interfaces and inefficient hardware are bringing about this change even within the Fortune 500-type companies, Zachmann asserted. In ad-

dition, the financial imperatives of corporate growth mean that companies are being forced into more and more desperate solutions. This has resulted in the proliferation of personal computers.

The decision to purchase personal computers, Zachmann observed, as that decision moves from being an unconscious one to a deliberate strategy, will result in a shake-up of the industry. The real victims of the microcomputer shake-up will prove to be those vendors that are insufficiently  
See **SMALL** page 73

### INSIDE

Turnkey Systems/62

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Auxiliary Equipment/70

## Spartacus' exit from deluged market a smart move



### HARD TALK

Tom Henkel  
CW Senior Editor

It is hard to imagine an "industry first" in the IBM 4300-compatible market, but it has happened. Spartacus Computers, Inc. has become the first firm to enter and then bail out of the overcrowded 4300 market in less than one year.

Just five months after delivering the

first one, the firm recently announced that it is dropping its K102 distributed processor (story on page 60). While Spartacus probably will not spend a lot of time boasting about its industry first, it does indicate that management at Spartacus may have come to its senses before it was too late.

The 4300-compatible market is unbelievably overcrowded. IBM alone has 12 systems in that market, all being sold to a fairly narrow window of users. Add to that compatible processors from National Advanced Systems, Inc. (NAS); IPL

Systems, Inc.; Cambex Corp.; and Nixdorf Computer Corp., and the result is more systems than there are users eager to buy them.

Spartacus should have taken the hint sooner from Control Data Corp., which dumped its 4300-compatible Omega line two years ago. It could have also made note of the financial problems at Magnuson Computer Systems, Inc., which was forced to file for protection from its creditors under Chapter 11 of the Federal Bankruptcy Act.

See **EXIT** page 76

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## SYSTEMS &amp; PERIPHERALS

# Spartacus changes focus, discontinues K102 processor

By David Olmos  
CW Staff

BEDFORD, Mass. — In what it termed a "new corporate focus," Spartacus Computers, Inc. has announced that it is no longer manufacturing and marketing its IBM-compatible K102 distributed processor. The announcement was made just five months after the first installation of the K102.

The company said it will concentrate its efforts on manufacturing and marketing its K200 local-area network control unit and its Knet networking software package. The K200 and Knet combination reportedly provide a channel-speed link be-

tween IBM 370-class processors and Ethernet-based local-area networks.

The announcements follow the departures last month of the company's founder and chairman, George C. McQuilken, and president, Carl M. Janzen, in a reported dispute between the two over management of the company.

In explaining the company's decision to abandon its K102 processor, Dennis G. Sisco, Spartacus' newly appointed president, said most potential customers viewed the K102 as a substitute for IBM's 4300 series processors. "Our business plans just didn't call for us to be structured to go head-to-head with IBM in the 4300

marketplace," Sisco said.

The 32-bit K102 system allows office users to download and run without modification programs compatible with IBM's 4300, 30 series and 3080 series mainframes in the VM environment. Spartacus declined to say how many K102s have been purchased since shipments began last December.

The K102's future also was clouded by IBM's introduction last October of its Personal Computer XT/370 microcomputer — an announcement that "created a lot of waiting and confusion in the marketplace," Sisco said.

A spokesman for Symbolics, Inc., the Cambridge, Mass., computer research and development company that was the K102's first user, expressed little concern about Spartacus' decision. "We're happy to have them concentrate on their strength — the K200," said Jim Kulp, manager of network system development.

Spartacus said it is discussing the sale of marketing and manufacturing

rights for the K102 with interested OEMs. "We still believe strongly that the product has a number of niches in the marketplace," Sisco said.

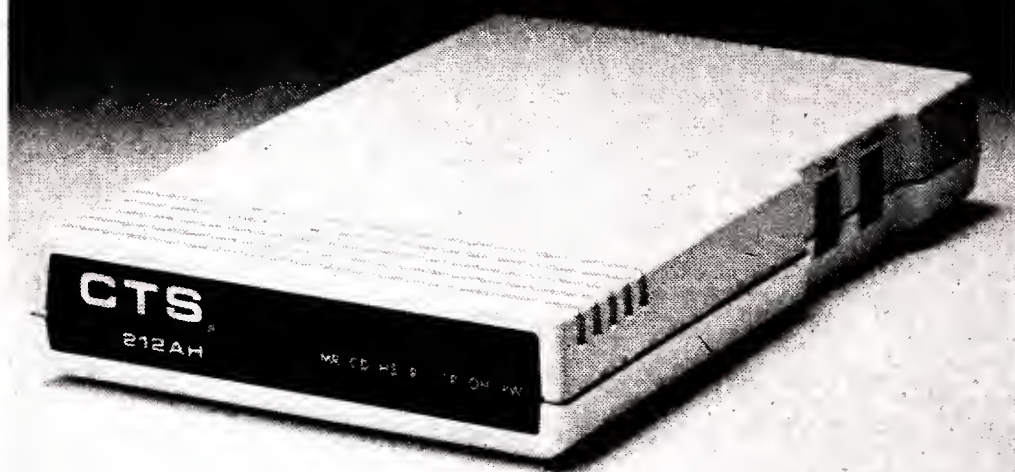
Meanwhile, the company said it will continue to provide maintenance and support for K102 users.

Sisco said that "almost without trying," Spartacus has generated "a great deal of interest" in its K200 and Knet products. That fact, together with the lagging sales of the K102, "led us to believe we are much better off focusing our resources on the networking environment," he said.

Commenting on the management shake-up, Sisco said, "The style and background of the Spartacus management that was in place at the time was not appropriate to moving the company forward at this point."

Spartacus also announced two new directors' positions. Peter Thornton, who joined the firm last December, was promoted to director of marketing, and Robert Steinberg, who joined the firm in February, was promoted to director of sales.

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## Sentinel unveils 16-bit series

CINCINNATI — Sentinel Computer Corp. has announced a series of three 16-bit multiuser general business systems that supersede its previous line of systems, the Models 30, 40, 50 and 80.

The DS-Series comprises three models: the DS-130, which can support up to five users; and the DS-140 and DS-180, each of which can support up to 32 terminals and 32 printers.

The systems use multiple Intel Corp. 8086 and 186 16-bit, 8-MHz processors and Winchester disk drives that can be expanded from 19M bytes to 1.2G bytes.

The DS-Series uses Sentinel's Dbos operating system, profit control application packages and other applications software. It is said to be soft-

ware-compatible with other Sentinel systems that remain in production.

The DS-130 features 128K bytes of internal memory, the DS-140 has 160K bytes and the DS-180 has 288K bytes.

The systems will be marketed through distributors such as OEMs, primarily for general business, industrial and distribution applications, according to a spokesman.

The DS-Series is available now.

Prices vary depending upon the system configuration and options such as disk drive size. Prices range from \$16,700 to \$35,000 for the DS-130; from \$21,200 to \$80,000 for the DS-140; and from \$36,500 to \$100,000 for the DS-180.

Sentinel is located at 9902 Carver Road, Cincinnati, Ohio 45242.

## Graphics terminals target DEC

SACRAMENTO, Calif. — Digital Engineering, Inc. has unveiled its first graphics terminals, the 4210 and 4205. The terminals are aimed primarily at users of Digital Equipment Corp. processors.

The firm claims the terminals, which employ what it calls Hiscan Graphics technology, are 10 to 50 times faster than its board-level products used to give DEC VT100 series CRT terminals graphics capabilities. According to Digital Engineering President Philip Grasso, the terminals also cost less than a VT100 equipped with the firm's older graphics boards.

The Hiscan terminals are equipped with two microprocessors — a Zilog, Inc. Z8002 16-bit microprocessor, said to achieve graphics speed of approximately 1M pixel/sec, and a second, proprietary microprocessor used for graphics coprocessing and based on a custom Cmos gate array, the vendor said.

The 4210 is a monochrome unit based on DEC's VR-201 monitor and a DEC VT200 keyboard. The 4205 is a color graphics terminal based on DEC's VR-241 color terminal and VT200 keyboard. Both terminals feature buyer-specified compatibility with Tektronics, Inc. 4027 or 4005 protocols or DEC's Regis protocol. The terminals also support the DEC VT220 and Tektronics 4010/4014 graphics functions, the vendor said.

The monochrome display offers an 800- by 600-pixel resolution, and the color display features a 800- by 300-pixel resolution. The terminals support 80- and 132-col. formats. Displays are nonsmearing interlaced and flicker-free, the vendor claimed.

The 4210 will be available from the vendor and authorized distributors after July 1 and costs \$2,195. The color 4205 terminal will be available Sept. 1 and costs \$2,995.

The vendor is located at 630 Ber-cut Drive, Sacramento, Calif. 95814.



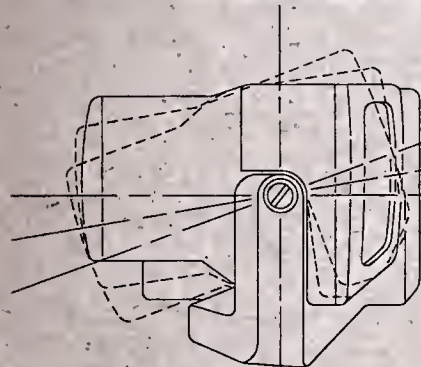


# The TeleVideo® 970. Nothing tops it for performance and design.

The TeleVideo® 970. The world's most advanced ANSI video display terminal.

It's equipped with the ANSI X3.64 standard so nothing can top its communications capability. And clear ergonomic superiority means nothing can top the 970 for user comfort and enhanced productivity.

## Unsurpassed Ergonomics



14" TILT-SCREEN

The 14-inch, non-glare screen tilts at a touch and displays up to 132 columns by 24 lines. There are

double high, double wide characters and an excellent selection of visual and graphic attributes. For an almost endless array of displays and forms.

## The Power of ANSI

The 970 is compatible with the DEC VT-100/52®, but offers more of the kind of power you'd expect to find at the top. Power that emanates from ANSI—the universal language of data management equipment.

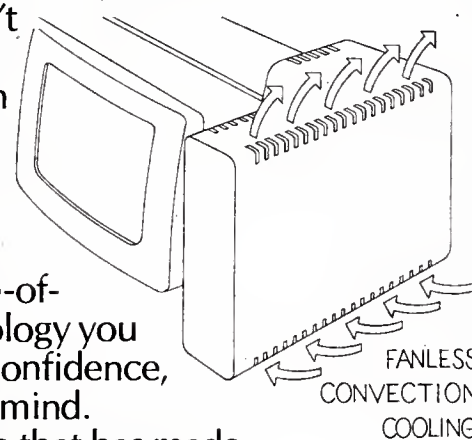
Power that is more effectively directed by 16/32 programmable, non-volatile function keys, logical attributes, a 256 character downloadable soft font, and an

optional Tektronix 4010/4014 graphics board.

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## SYSTEMS &amp; PERIPHERALS

# Mcdata unveils IBM-compatible controller

BOULDER, Colo. — Mcdata Corp. has announced an IBM 3274-compatible controller designed to connect directly to IBM and compatible mainframes and peripherals in either IBM's Systems Network Architecture (SNA) or non-SNA mode.

The MC74-41A is said to support IBM display sta-

tions, IBM printers, the IBM 3299 coaxial multiplexer and products from Mohawk Data Sciences Corp., Trivex, Inc., Memorex Corp., Phaze Information Machines Corp., Tel-ex Computer Products, Inc. and other manufacturers.

According to the vendor, display station support includes seven-color, self-con-

verging monitors, extended highlighting and programmed symbols. Features are said to allow users to select either Mcdata mode or IBM 3270 mode for the operator information area.

The vendor reported that Mcdata mode provides plain-language status messages, field characteristic indica-

tors, cursor position information and a response-time monitor.

Available now, the MC74-41A is priced at \$18,230, according to the vendor.

Additional information can be obtained from Mcdata, which is located at 4665 Nautilus Court S., Boulder, Colo. 80301.

## TURNKEY SYSTEMS

### NCR CORP. Modular Lodging Systems

NCR Corp. has announced two versions of its Modular Lodging Systems (MLS), designed to allow MLS to be used in large and very large hotels.

MLS is said to offer property and guest management operations and features such as self-service check-in and check-out, point-of-sale systems, telephone accounting and maid dial-in.

NCR had previously announced MLS for small and medium-size hotels.

For large properties ranging from 500 to 1,000 rooms, a typical MLS includes an NCR 9300, a 32-bit general-purpose computer with 2M bytes of memory, two disk drives, up to 37 VDTs and line, folio and report printers. Prices start at \$175,000.

The MLS for very large properties, such as hotels with more than 1,000 rooms, typically includes an NCR 9050 computer, two disk drives, up to 80 VDTs, various printers and interfaces. Prices start at \$400,000.

Complete redundancy is offered for both systems as an option. Both systems are available now.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479.

### CONTROL RESOURCES CORP. 800 series

Control Resources Corp. (CRC) has announced the 800 series Automated Network Maintenance System for remote-channel bank applications, targeted for large network users and telephone companies.

The 800 series is a modular, microprocessor-based system that provides alarm reporting, control and data and voice testing of unmanned channel banks configured for local distribution and foreign exchange and trunk access or acts as an unattended switching center. The system was first available in 1981.

System components are the CRC 800 Remote Site Equipment (RSE) and the central-site Tech Control Position (TCP). Test functions supported by the TCP include remote data base inquiry and update, control of remote-site test configurations and measurement, insertion of signals originating at the TCP to circuits at the remote site and monitoring of traffic at the remote site.

The RSE installation consists of shelf-mounted modules that include local intelligence with data base, alarm detectors, autodial and answer modem, circuit access switching, transmission test

Continued on page 69

## KEY TRONIC Enhances The VT-100\* Keyboard



Enhance your DEC VT-100\* with a Key Tronic keyboard peripheral. This detached, low-profile keyboard is plug-compatible with the DEC VT-100\* terminal and meets new ergonomic specifications. It also features reliable microprocessor electronics, solid-state capacitive switches, and positive tactile feedback.

Suggested Retail Price: \$379.00  
To order Model KB-100, call Toll Free  
1-800-262-6006 for the retailer closest to you.  
(7 am-3 pm Pacific Time)  
Warranty information may be obtained, free of charge by writing to the address below.

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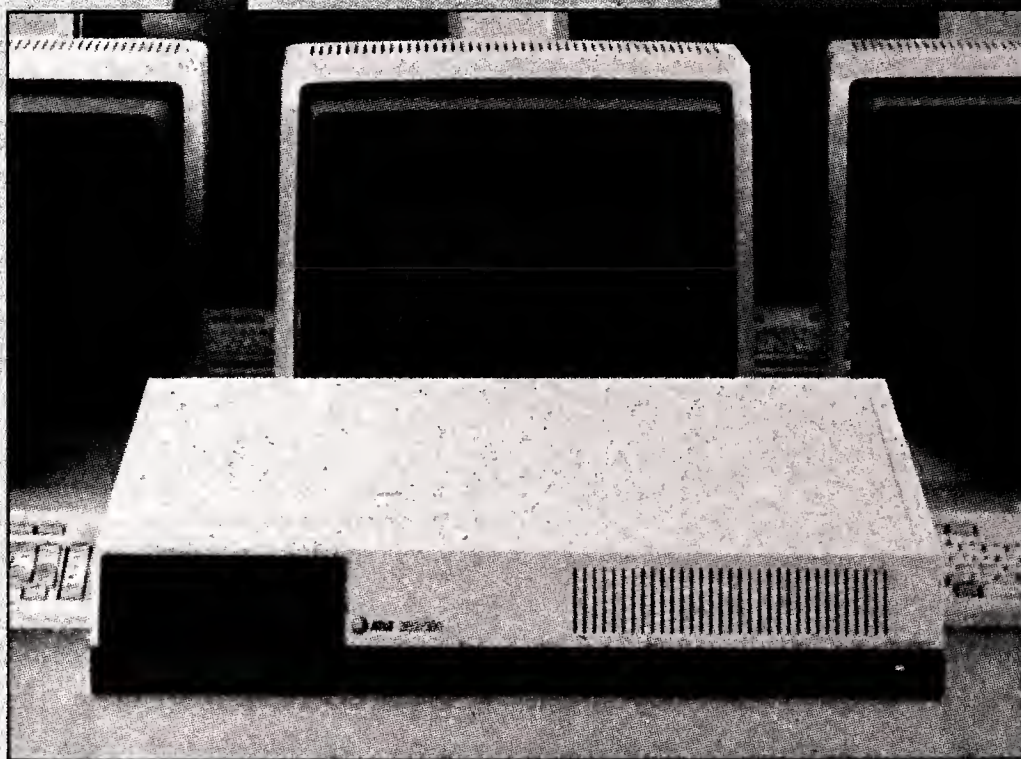
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# 3B2

It is small enough to sit on a desk top. Yet it can accommodate up to eighteen users.

It is a 32-bit super microcomputer running UNIX System V. But it has the power of a mini computer.

It incorporates 256K DRAM chips for high-capacity main memory of up to 2 megabytes. So more is delivered than with the average microcomputer, and at a lower cost per station.

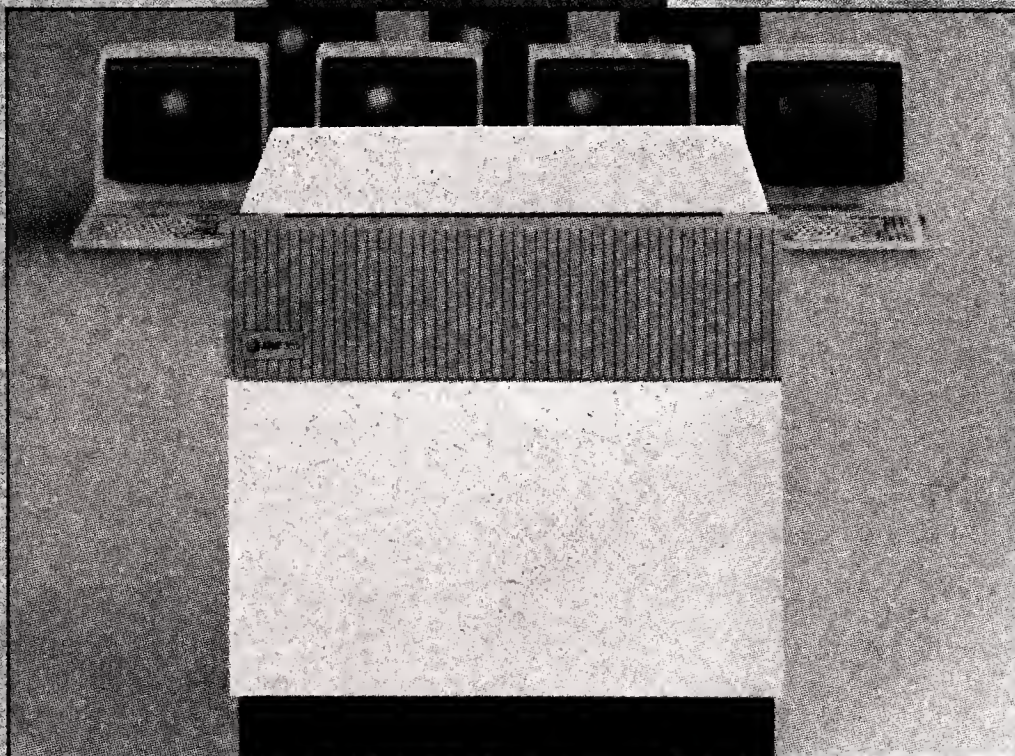
It's the 3B2/300. From AT&T.

Perfectly targeted for an office where several people need a desk-top computer, and there's a need to accommodate growth. And it can function as an intelligent network host or file server for PCs.

And the 3B2/300 is available in a variety of solutions packages with flexible growth options.

It is the most advanced super microcomputer your customers can buy today.





## 3B5

These general-purpose, midrange, true 32-bit, super minicomputers are designed to run UNIX System V and can accommodate up to sixty users without putting a dent in response time.

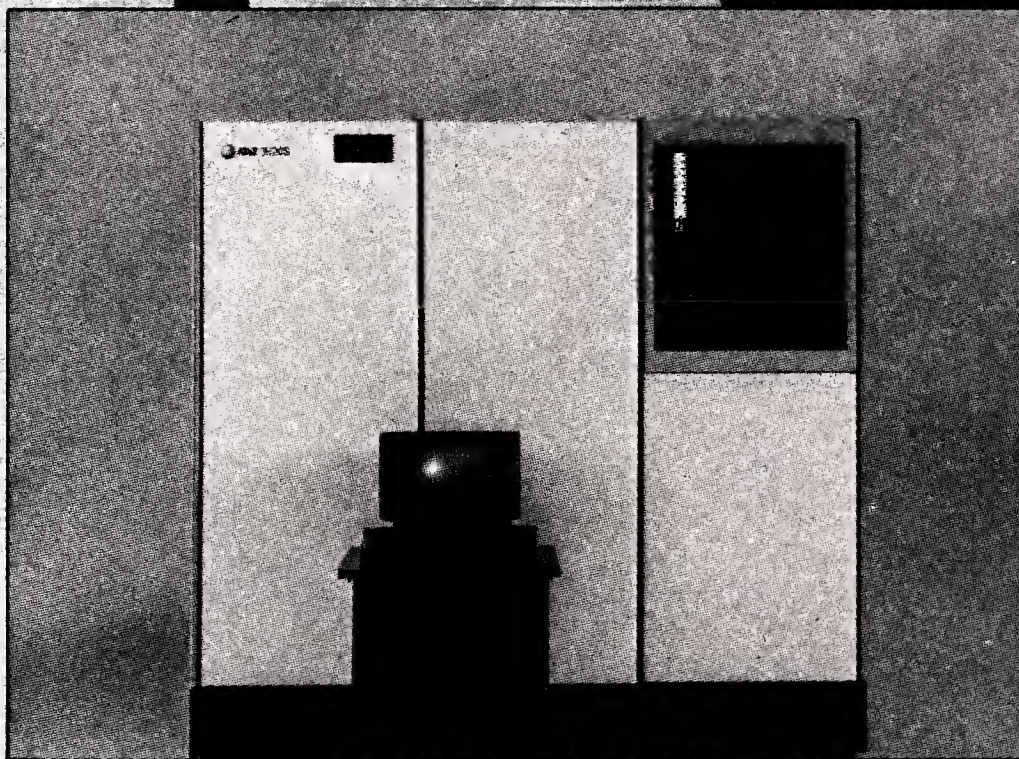
They are remarkably easy to use, and easy to maintain because they are self-diagnostic. They are flexible, powerful tools for a variety of applications, such as software development, office systems, and CAD/CAM.

They're the 3B5/100 and 3B5/200. From AT&T.

They can be configured to suit customer needs with a wide variety of I/O, peripheral, memory, and communications options for cost-effective growth. This makes them good investments for your customers.

These computers fit neatly into the office environment. And are incredibly quiet, cool, efficient, and plug into standard wall outlets.





# 3B20S

The 3B20S computer is the high-end sup of the 3B family. It runs UNIX System V and designed to meet the rigorous needs of data centers, developers, office service organizations, manufacturing locations.

When a customer outgrows these capabilities, you simply add the attached processor forming the 3B20A. And add up to 80% to your performance range. Or you can begin serving your needs with the 3B20A right from the start.

And the growth from the 3B20S to the 3B20A occurs as painlessly as possible with only a modest increase in cost.

Both computers are energy efficient and easy to install. They perform without complex and expensive environmental controls. And unlike most computers of this capacity, the 3B20S and the 3B20A do not require air conditioning or raised floors.





# 3B20D

It is a powerful, 32-bit super minicomputer that will set a new standard for uptime. It runs the new UNIX RTR operating system, providing time-sharing and introducing real time and fault-tolerant features.

It operates continuously even during hardware faults, data-base mutilations, repair, software updates and growth.

It is the 3B20D. From AT&T.

It is ideal for applications requiring ultra-reliability and fast response such as reservation systems, command and control systems, on-line banking systems, and others where computer outage means serious or intolerable business losses.

Like the 3B20S and 3B20A, the 3B20D does not require air conditioning or raised floors.

For continuous computing, the 3B20D is unsurpassed in its class.



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But our commitment doesn't end with state-of-the-art products. When you join hands with AT&T you also receive superb service.

We offer complete marketing support packages; product service and maintenance; financial support; and a full range of consulting services.

This is a national support system that is second to none. And with the unsurpassed R&D capability of our own AT&T Bell Laboratories, you can market the 3B family of products with confidence and guarantee them to your customers.

To find out more about this remarkable family of computers, and our comprehensive and flexible OEM/VAR programs, call us at 1-800-833-9333.





## SYSTEMS &amp; PERIPHERALS

Continued from page 62

circuitry and fallback switching.

The price for the TCP is \$25,000, and the RSE is \$5,000 per site, according to the vendor.

*Control Resources, 44 Burlews Court, Hackensack, N.J. 07601*

## TERMINALS

FALCO DATA PRODUCTS, INC.  
Fame 100

Falco Data Products, Inc. has announced a high-end addition to its Fame series of terminals.

The Fame 100 was designed to emulate Digital Equipment Corp.'s VT100 and VT52 models. It features a 24-line by 80-col. or 132-col. display and a 25th line for status information. According to the company, there is no loss of data when shifting between 80 and 132 columns.

Fame 100 also reportedly features a block mode with VT131 edit commands. It is said to offer 18 user-programmable function keys, with the functions retained by the terminal even when the power is off.

The terminal includes a 12-in. phosphor nonglare screen with brightness controlled from the keyboard.

Falco said that a full-page, set-up screen is standard, as are split-screen, smooth scrolling and character printing in an 8- by 12-in. dot matrix with lowercase descenders.

It utilizes two bidirectional RS-232C ports, which permit connection to dual processors or use as an extension port.

It is priced at \$1,195.

*Falco Data Products, 1286 Lawrence Station Road, Sunnyvale, Calif. 94089.*

PERTEC COMPUTER CORP.  
Model 100

Pertec Computer Corp. has introduced a color intelligent terminal designed for its System 3200 line of small business systems.

The Model 100 reportedly provides eight foreground and eight background colors. It also includes a detachable keyboard, tilt-and-swivel adjustments, 14-in. screen; brightness control and 10-key numeric pad. It provides both 80- and 132-char. width displays.

The Model 100 is available with either 16K or 64K bytes of memory. It is priced at between \$3,700 and \$4,000, depending on capacity.

*Pertec Computer, 17112 Armstrong Ave., Irvine, Calif. 92714.*

## PRINTERS/PLOTTERS

ALPHA MERICS CORP.  
Alphaplot

Alpha Merics Corp. has announced a flatbed plotter designed to produce E-size 36- by 48-in. drawings.

Alphaplot features 36-in.-wide paper and a usable plotting area of 34 by 24 inches. Drawings reportedly are produced in two halves with the paper being moved manually between plots.

It is designed to operate with Autodesk, Inc.'s Autocad, a generalized, two-dimensional computer-aided design (CAD) software package.

The plotter is priced at \$5,895. The CAD software costs \$15,000.

*Alpha Merics, 20931 Nordhoff St., Chatsworth, Calif. 91311.*

BELL & HOWELL, INC.  
6600 COM

Bell & Howell, Inc. COM Division has announced the 6600 COM printer system, which is said to produce wet or dry, on-line, cut fiche in less than one minute.

Features of the 6700 roll output printer have been incorporated in the 6600, the vendor said. The 6600 is compatible with the IBM 360 and compatibles. It uses a Digital Equipment Corp. PDP-11 and a Bell & Howell 6601 printer which prints at 25,000 char./sec.

The 6600 is priced at \$115,000 to

\$120,000, according to the vendor.

*Bell & Howell COM Division, 16691 Hale Ave., Irvine, Calif. 92714.*

IMAGITEX, INC.  
Level 4 system

Imagitex, Inc. has introduced its Level 4 system, a turnkey black-and-white image make-up system which reportedly allows users to transfer line art or continuous-tone images directly to output devices, such as typesetters, and to merge them with text.

The Level 4 system has applications in newspaper and magazine publishing and in technical documentation, according to the vendor. It is designed to integrate scanning, image processing and output processing into a single system.

In its standard configuration, the Level 4 system includes an Imagitex scanner, three Imagitex processors, three 158M-byte disk storage units, a workstation with color monitor and image processing software. When used as a modular addition to the firm's Level 3 system, the Level 4 system includes an additional microprocessor and an intelligent disk subsystem, the vendor noted.

Imagitex will reportedly offer device drivers for Compugraphic Corp.'s 8600G, Monotype, Inc.'s Lasercomp MKIII and Autologic, Inc. APS5G models.

Level 4 system costs \$150,000.

*Imagitex, 77 Northeastern Blvd., Nashua, N.H. 03062.*

INNOVATIVE ELECTRONICS, INC.  
Innovator 202-FC

Innovative Electronics, Inc. has announced that its Innovator 300 LPM Printer System now features a communications interface that provides IBM 2780/3780 emulation.

The Innovator 202-FC board is said to feature space compression and expansion, processor interrupt reception, conversational mode, transparent reception of Ebcidic data, component selection, vertical-format control, horizontal-format control and switch-selectable 2780/3780 and Ascii/Ebcidic modes.

Available in 80- and 132-col. models, the printers are available now with the Innovator 202-FC board.

The 80-col. model is priced at \$4,995, and the 132-col. model is priced at \$5,495.

*Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.*

VERSATEC, INC.  
Model 122

Versatec, Inc. has announced an interface designed to support electrostatic plotting for Digital Equipment Corp.'s PDP-11 and VAX-11 computers using DEC Unibus I/O architecture.

The Versatec Model 122 is said to operate in direct-memory access (DMA) and non-DMA modes, support 450K-byte transfer rates and provide differential output that allows printer and plotter operations up to 1,000 feet away from the computer.

Software includes a print/plot driver compatible with DEC's RSX-11M, RSX-11M-Plus, VMS and RT-11.

Carried on a single printed-circuit board, it is priced at \$2,200.

*Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.*

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HP 10542A Remote programming interface cable.

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## SYSTEMS &amp; PERIPHERALS

## GRAPHICS SYSTEMS

ORCATECH, INC.  
Orca3050

Orcatech, Inc., a supplier of graphics computer systems to the computer-aided design and engineering markets, has introduced the Orca3050 workstation.

The Orca3050 features a Unix operating system, application processing based on Motorola, Inc.'s 68000 microprocessor, a memory range of 512K bytes to 2.5M bytes, resolution of 1,024 by 1,024 pixels and Ethernet network-

ing capability, according to the vendor.

The Orca3050 is suited to applications that include computer-aided design, electrical or mechanical; presentation graphics; and simulation graphics and mapping.

The price ranges from \$20,000 to \$50,000, depending on memory and on which features are chosen.

*Orcatech, 1000 Morrison Drive, Ottawa, Ont., Canada K2H 8K7.*

HUMAN DESIGNED SYSTEMS, INC.  
Concept GVT+

Human Designed Systems,

Inc. has announced the Concept GVT+ graphics display terminal, which is compatible with Tektronix, Inc.'s 4010 and can be used to preview complex graphics presentations or produce business graphics such as pie and bar charts. It can also be used in engineering computer-aided design and manufacturing applications.

Resolution is 512 by 250 pixels with automatic scaling and 1,023 by 1,023 pixels for compatibility with Plot-10 and other standard graphics for Tektronix terminals. The Concept GVT+ also offers Ansi X3.64 conformance, Digital Equipment Corp. software compatibility and an 80-col. or 132-col. display.

The price for the terminal is \$1,895 with four pages of memory and \$2,045 with eight pages of memory. An APL version, Concept GVT-APL+, which provides APL and Ascii character sets and Tektronix 4013 software compatibility, is priced at \$2,095, the vendor said.

*Human Designed Systems, 3440 Market St., Philadelphia, Pa. 19104.*

## BOARD-LEVEL DEVICES

OCTAGON SYSTEMS CORP.  
Omnocard

Octagon Systems Corp. has announced a multifunction STD bus card to operate as a development system, a control system and an educational tool in fields such as robotics, energy management, data acquisition, process control, material handling, science and education.

Omnocard is said to be programmable in Octagon's Cambasic, which, the vendor claimed, reduces software development costs because assembly language programming is not required. It includes an RS-232 serial port to communicate with CRTs, printers and personal computers.

Available now, it is priced starting at \$575.

*Octagon Systems, 6501 W. 91st Ave., Westminster, Colo. 80030.*

SELANAR CORP.  
Graphics boards

Selancar Corp. has announced a second-generation, retrofit graphics board featuring pen plotter interface and independent memory and said to produce presentation-quality hard copy with terminals of any resolution.

The board's graphics memory of 512K bits is said to reduce transmission time between the terminal and output devices and between the terminal and the CPU. The board is compatible with any graphics software with a

Tektronix, Inc. 4010/4014 driver, the vendor said. The boards have a resolution of 800 by 240 pixels on the low end and 800 by 480 pixels on the high end.

Selancar manufactures retrofit boards for use with terminals from Digital Equipment Corp., Qume Corp., Televideo, Inc., C. Itoh Electronics and Lear Siegler, Inc. The boards can also be used with Selancar's Hirez 100 graphics terminal.

The graphics boards are priced at \$795 or \$1,195, depending on resolution, the vendor said.

*Selancar, 437-A Aldo Ave., Santa Clara, Calif. 95050.*

## AUXILIARY EQUIPMENT

BOWMAR/ALI, INC.  
273A

Bowmar/Ali, Inc. has introduced a portable error rate test set, the 273A, which includes a self-contained receiver and transmitter for testing digital transmission systems or other components. The 273A's transmitter reportedly provides an internally generated test signal at four T1-compatible modes.

The 273A reportedly operates independently of its

*Continued on page 72*

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The full-featured ADDS Viewpoint/Color costs less than many monochrome terminals so there's no reason not to let color improve your communications company-wide. That makes nine good reasons to buy ADDS Viewpoint/Color terminals. Red, blue, green, yellow, cyan, magenta, white, black and price.



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### **ADDs**

Applied Digital Data Systems Inc.  
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## SYSTEMS &amp; PERIPHERALS

**Continued from page 70**

transmitter and performs bipolar violation detection while working in conjunction with its own quasi-random transmitter or equivalent source.

It is also said to include automatic and manual resynchronization of the receiver, using a resynchronization threshold that is strap selectable for 12 errors.

The 273A costs \$2,750, with a one-year warranty.

*Bowmar/Ali, 351 Main St., P.O. Box 10, Acton, Mass. 01720.*

**HEWLETT-PACKARD CO.  
HP 1630G**

Hewlett-Packard Co. has announced a logic analyzer said to provide extended software performance analysis, state analysis and timing analysis.

The HP 1630G reportedly features 65 channels, with 57 for state analysis and the other eight for either state or timing analysis; nonvolatile memory for storing a disassembler and instrument configuration; time-tagging for state analysis; three additional measurements for software performance analysis; an HP 9121S/D single/dual flexible disk drive; and a full compare mode.

According to the vendor, it is useful for software development and is particularly well-suited for applications involving 16-bit microprocessors and multiple-bus monitoring. Use with an HP desktop computer results in an automated data acquisition capability and allows testing to continue overnight and on weekends, the company said.

The addition of a graphics printer reportedly allows production of a paper copy of the HP 1630G display.

The HP 1630G is available four weeks after receipt of order and costs \$12,100.

*HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.*

**GLOBAL SPECIALITIES/  
ENL INSTRUMENTS  
Directors**

Global Specialities/ENL Instruments, a subsidiary of Interplex Corp., has introduced the Directors line of multiport data switches, each of which permits the connection of three peripherals to one computer or three computers to a single peripheral.

Installation is via four rear-panel-mounted female connectors which the vendor said accept standard male 25-pin EIA RS-232 cable terminators from any computer. Four models are available, and they can be used alone or interconnected. Director Model 308 switches eight commonly used lines, while the 308L offers LEDs to monitor active signals on six lines.

The cost for Model 308 is \$120 and for the 308L, \$135. The cost for Model 324 is \$145, for the 324L, \$160.

*Global-Data, A Division of Global Specialties, 70 Fulton Terrace, New Haven, Conn. 06512.*

**DOLCH LOGIC  
INSTRUMENTS, INC.  
96100-32**

Dolch Logic Instruments, Inc. has announced a 100

MHz logic analyzer trace unit designed for use with Dolch's Colt and Atlas logic analysis systems.

The 96100-32 trace unit reportedly configures a Colt or Atlas for fast timing applications in hardware and software analysis and permits display of the real-time operation of the unit under test.

The trace unit features 32 channels for asynchronous or synchronous recording at rates up to 100 MHz and

data-qualified recording.

It costs \$5,300 with programmable-threshold input probes and software, the vendor said.

*Dolch Logic Instruments, 3052 Orchard Drive, San Jose, Calif. 95134.*

**MICROFRAME, INC.  
Data Lock & Key**

Microframe, Inc. has announced Data Lock & Key, a protection system designed

to secure mainframe computers from unauthorized dial-up access.

The system consists of two devices, the Data Lock, which is attached to the mainframe, and the Data Key, which is installed between the terminal and its modem.

The devices feature six levels of protection, such as barring access for any Data Key that has been reported lost or stolen, according to

# Introdu LinkTha

Today, you have to live in two different worlds. One belonging to IBM. The other to everyone else.

With that in mind, companies have come along with a variety of products that attempt

to link the two together. But somewhere along the line, they all look a little dumb. Enter the AVATAR PA1000™ Protocol Converter. It's the most intelligent way to

bring personal computers, portable computers, or low-cost ASCII terminals into the IBM coaxial environment. For the first time, overburdened DP/MIS executives can look forward to truly smooth integration, minimal

confusion, and fewer demands on their time. And users can get an affordable, easy-to-use way to tap the riches

of their IBM mainframes.

So if you're looking for the best of both worlds, keep reading. And you'll see why the AVATAR PA1000 can out-think any product on the market.

First of all, the AVATAR PA1000 is an almost universal link. With no modification, it connects to virtually any personal or portable computer you have: IBM, Apple, DEC, TRS 80, Kaypro, COMPAQ, NCR, and others.

The AVATAR PA1000 also connects to the DEC VT100, IBM 3101, LSI ADM5,

Televideo 910, ADDS Viewpoint or other compatible terminals.

The PA1000 connects coaxially to an IBM 3274/3276 cluster controller, so whatever personal computer or terminal you use will perform all the functions of an IBM 3278-2. The coaxial connection also means you won't be in for a future shock: ever-changing IBM protocols will be no problem.

|                                  | AVATAR PA1000 vs. | IRMLINE™ |
|----------------------------------|-------------------|----------|
| Easy to install                  | YES               | YES      |
| Q/A installation                 | YES               | NO       |
| English language commands        | YES               | NO       |
| Help screens                     | YES               | NO       |
| Keyboard types                   | 5                 | 1        |
| Remote dial-in security password | YES               | YES      |
| Dual host access                 | YES               | NO       |
| Local screen printout            | YES               | NO       |
| 3278 status line modes           | 3                 | 1        |
| Price                            | \$995             | \$1395   |
| Availability                     | Immediate         | (?)      |

Two hosts are better than one. So in addition to the coax connection to IBM, the

TRS is a trademark of Tandy Corporation. COMPAQ is a trademark of COMPAQ Computer Corporation. ADM5 is a trademark of Lear Siegler, Inc. ADDS Viewpoint is a registered trademark of Applied Digital Data Systems, Inc. Dow Jones is a trademark of Dow Jones & Company, Inc.



## SYSTEMS &amp; PERIPHERALS

the vendor.

It uses a proprietary method involving no passwords or dial-back. According to the vendor, a remote device can connect with the mainframe only after the Data Lock and Data Key carry on a conversation, which varies with each connect and lasts about one second. The Data-Lock screen is said to display information about protected lines.

Data Lock supports four

lines and all protocols, and features a log port for hard-copy audit trails, standard connection to RS-232-equipped mainframes and modems and automatic determination of modem type and baud rate, according to the vendor.

Data Lock costs \$4,000 and Data Key \$400, according to the vendor spokesman.

*Microframe, 205 Livingston Ave., New Brunswick, N.J. 08901.*

**SMALL** from page 59

nimble to adapt to the changing environment in large systems organizations.

"State-of-the-art personal computer capabilities cannot be provided economically with traditional computer systems, and the soon-to-be-available capabilities of personal computers and workstations will go far beyond what is now available," he declared.

With larger memory capacity, users now routinely have the capability to do things on personal computers that they were never able to do on a multiuser system, he noted. Turning to today's micro market, Zachmann said one of the key elements in the success of personal computers is bandwidth.

Personal computers, he attested, inherently provide high display-to-memory bandwidth, and this is key to

their ability to provide interface capabilities superior to those found in terminal-to-computer links.

The personal computer of the late 1980s, Zachmann said, will be a 32-bit processor with from 1 million instructions per second (Mips) to 4 Mips; from 1M to 16M bytes of primary storage; between 100M- and 1G bytes of Winchester disk storage; and over 1G byte of optical disk storage.

**GOULD** from page 59

same performance as a comparably configured Digital Equipment Corp. VAX-11/750.

The system is based on the Convergent Technologies, Inc. Miniframe and supports the Gould PT100 intelligent terminal, which features local-area network communications of 307K bit/sec and 64K bytes of random-access memory to execute some system code at the user's desk.

It also features object code compatibility with Gould's 128-user Powerstation 3000.

The UTX/2000 is said to offer features such as Gould's Window Manager and its Key Prompt shell program.

The system is available with 10M-, 20M- or 40M-byte formatted capacity fixed disk drives and a 640K-byte backup floppy disk drive.

An RS-422 communications port is designed to support up to eight multi-dropped PT100 terminals, while two RS-232 ports for Ascii terminals, serial printers or asynchronous/synchronous communications and one parallel printer port are also provided.

A company spokesman said pricing, discounts and support for the Powerstation 2000 are targeted toward the value-added remarketer channels that Gould intends to develop.

A Powerstation 2000 with 512K bytes of main memory, a 20M-byte hard disk and UTX/2000 costs \$8,995, the vendor said.

Gould is at 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33310.

# cing The tThinks.

AVATAR PA1000 gives you an extra RS232 port. That gives you access to other local or remote asynchronous host computers or local printers.

HELP! If you need it (and who doesn't) you have help screens to put you back on track. The PA1000 also has easy-to-use, English language commands.

With a few simple keystrokes, you can switch from your IBM to the extra RS232 port, giving you access to private data networks and public databases like Dow Jones.

And when you switch back, the AVATAR PA1000 is smart enough to remember your IBM screen.

In a distributed terminal network, remote dial-in from personal computers or asynchronous devices is increasingly

important. You can dial into your PA1000 at the nearest cluster controller, and reduce communications costs dramatically in the process.

Just by typing "1-2-3" (how much simpler can you get?), the PA1000 automatically determines the baud rate of the attached device and is ready to go.

In just five minutes (no kidding) you can install the AVATAR PA1000. And you don't need to be a computer operator.

The AVATAR PA1000 even gives you a file transfer option that lets you transfer information back and forth between your personal computer and an IBM mainframe.

What will AVATAR think of next? The latest news is our PA1500, a link that lets you

print the output from your IBM host on a low-cost ASCII printer. It supports high-speed dot-matrix, letter quality, and line printers. It's very simple to install. And it will save you a bundle.



To find out more about the AVATAR PA1000, our company, our distributors and dealers, or our plans, just call us. In Canada or Massachusetts: 617-435-6872. Everywhere else: 800-828-2004 Ext. 600.

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## SYSTEMS & PERIPHERALS

### HALT from page 59

spokesman said.

The Reliant's internal architecture consists of multiple application processors, dual data buses, dual file processors, dual disk controllers, mirrored disk drives and dual power supplies. The unit occupies a cabinet about the size of a two-drawer file cabinet. The Reliant can use ac power supplies and does not require special environmental conditions.

The application processors handle all communications between users and the system. File processors govern internal data transfer and all system printers. By using twin data buses, file processors and disk subsystems, the Reliant can process mirror images of each system operation.

Each 8086-based application processor board has 512K bytes of random-access memory, a triported mailbox for communications with both data buses and four RS-232 serial ports. Customers can add an optional Intel 8087 coprocessor for number crunching applications, noted Brian Keane, the firm's director of marketing.

The Reliant processor includes a systems activity monitor, which reportedly provides diagnostics help to nontechnical users. Keane said Nohalt supports C, PL/I, Fortran, Cobol, Basic and Pascal programming languages. In addition, the Reliant system can support applications developed to operate under Digital Research, Inc.'s CP/M and MP/M operating systems without modification.

A basic Reliant configuration, consisting of a cabinet with a 16-bit application processor, mirrored system components, twin 20M-byte disk drives, the NH-DOS operating system and utilities, costs \$25,570.

A processor with 16 application processors and a 140M-byte disk drive costs \$70,000. Systems are available now.

Nohalt Computers is located at 1750 New Highway, Farmingdale, N.Y. 11735.

### EXIT from page 59

Or perhaps some Spartacus eyebrows should have been raised over the performance of IPL, which has been losing money for the past year.

Moreover, it is no secret that IBM is getting downright ruthless now that the cloud of the federal antitrust suit has been lifted. The "me-too" products that once provided handsome profits are clearly no longer sure things. Companies that expect the world to beat a path to their doorsteps just because their products are like IBM's are in for a big surprise.

But none of this means that the once-powerful makers of IBM plug-compatible mainframes are going to die off entirely. As big as it is, IBM cannot be everything to everyone. There will always be niche markets waiting for clever entrepreneurs.

For example, IPL is trying to recover from financial hard times by setting its sights on the IBM-compatible fault-tolerant market. CDC seems to be doing a healthy business in selling IBM-compatible peripherals without the Omega CPUs. And Spartacus announced that it will focus on selling its K200 local-area network and Knet networking software, which offers users of IBM 370-era systems a channel-speed link to Ethernet.

Plug-compatible manufacturers are vital to IBM users. They provide IBM users the options that IBM may not be willing to offer. But as the IBM-compatible market gets tighter, the plug-compatible manufacturers are going to have to get smarter. Simply developing reverse-engineered IBM look-alikes takes too long and is too expensive.

Some firms, like Amdahl and NAS, are already committed to their own processor architectures and are focusing on maintaining software compatibility with IBM.

Such strategies are the plug-compatible manufacturers' only chance of survival. And the sooner would-be IBM-compatible vendors realize that they must offer unique products in an IBM world, the better off users will be.



# IS THE MICRO BOOM BACKFIRING ON YOU?

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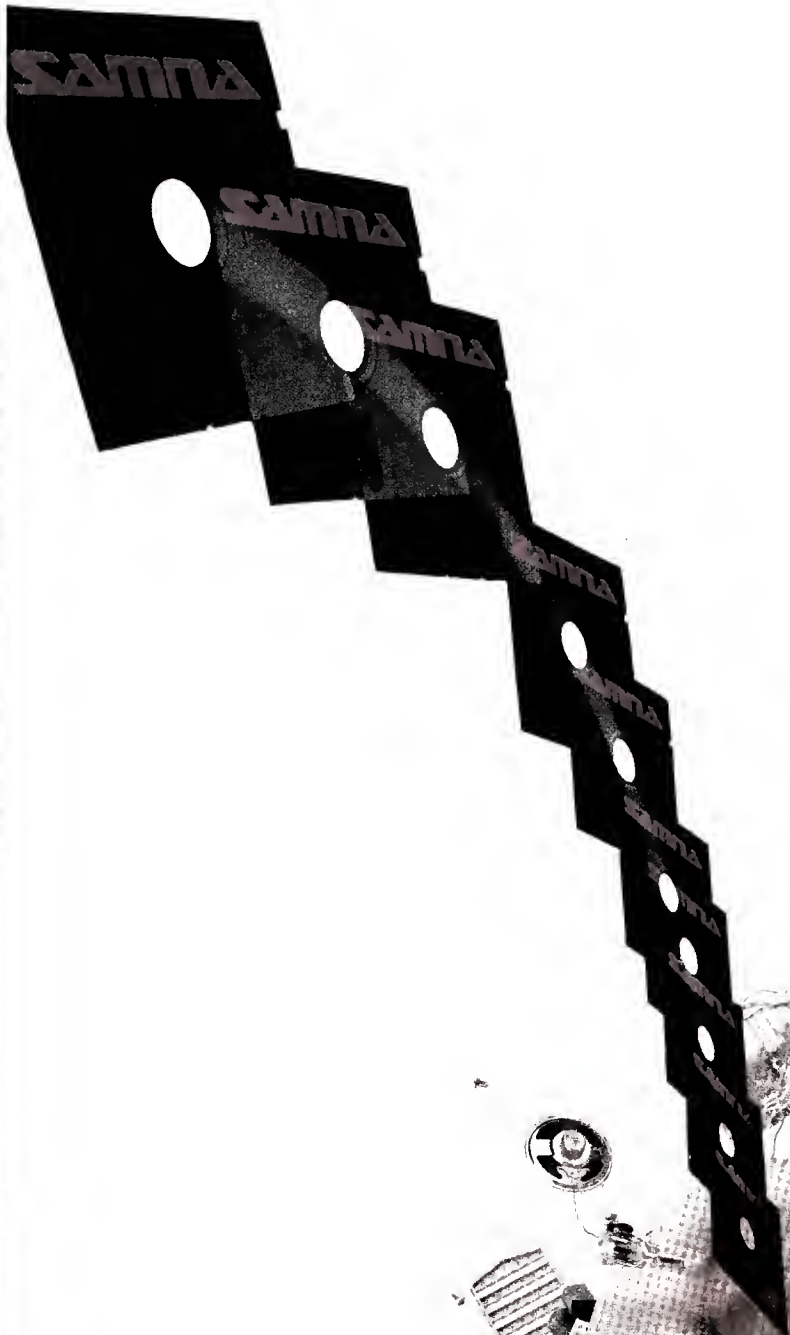
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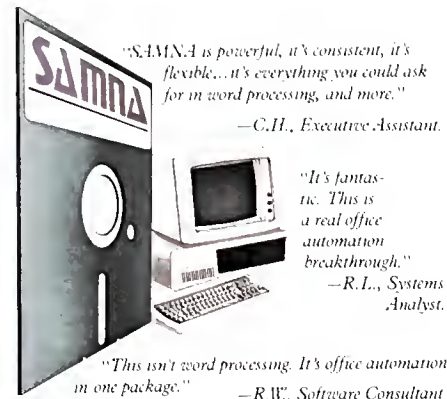






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On April 17, 1984, we asked a group of Office Automation supervisors, secretaries, and analysts to compare SAMNA Office Automation software to the dedicated word processors they've used the most.

The results were shocking. All 10 of these OA professionals were convinced that SAMNA far surpassed their stand-alones in terms of pure power, functionality, and user interface. In fact, they felt that

"With SAMNA's features, I can do better word processing, faster." —J.B., Word Processing Secretary.

SAMNA flat out murdered them.

They were mightily impressed with SAMNA's powerful word processing capabilities. Its screen-to-page fidelity, with on-screen display of boldfacing, underscoring, centering, and left- and right-justification. Its split screen editing, that lets you display—and even edit—two documents simultaneously. Its automatic pagination and footnoting. Its automatic search and replacement of a word, name, or phrase anywhere in a document. Its glossary of standard paragraphs (so useful in creating contracts and legal documents). And the consummate ease with which SAMNA performs additions, deletions, and text movement.

They had never seen a word processor that could scroll horizontally almost without limits, then electronically fold the document so you can compare left and right margins side by side. SAMNA can, with its unique Electronic Fold feature.

SAMNA can also Zoom, letting you reduce a large or wide page down until it can be viewed on the screen



Wide page? SAMNA "folds" it to compare left and right margins side by side.



SAMNA can "Zoom" a page down until you can display it all on screen.

They also found that SAMNA could perform multiple formats in a single page or document and much, much more. Much, much more easily than any of these OA professionals had thought possible.

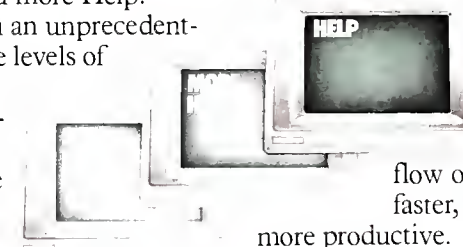
When the comparison was over, all 10 participants saw no comparison at all. SAMNA outclassed any word processor they'd ever used. And word processing was just the beginning.

**SAMNA is easy to use. Even if you've never done any word processing.**

As soon as you get SAMNA software, you can be doing word processing like a pro. Its training and reference manuals are extensive, yet very easy to follow.

Think you'll need more Help? SAMNA offers you an unprecedented three progressive levels of help.

It gives you information as you need it, so you don't have to learn a function



until you intend to use it.

The first level of Help reminds you of your next keystroke. The second level leads you through the function step by step. And the third level gives you a complete explanation of the function in addition to a guide through it.

If you make a mistake, SAMNA automatically gives you the next level of Help. It won't just tell you you've made a mistake; it will tell you how to correct your mistake, too.

That's more help than any dedicated word processor or PC word processing software offers. Plus you get a free applications newsletter and unlimited use of SAMNA's toll-free INFO-LINE for 30 days (extendable on an annual basis).

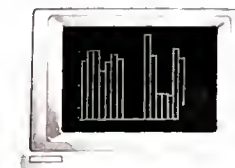
**Seamless Integration™ means SAMNA can work with text, math, line drawings, and more...without a break.**

SAMNA lets you work with text, then switch to integrated five-function math, free-form line drawing, list management, or spelling checker as you need them, without a break.

Without going back to a window or changing screens. It gives you an uninterrupted

flow of work that's faster, more natural. And more productive.

Call for Help and SAMNA will lead you all the way through any function.



Build a bar chart or draw up a table of figures with SAMNA's line drawing.

Now, about those integrated functions. The five-function math is a built-in calculator. You can use it anywhere, without having to stop and set up rows and columns. The line drawing lets you construct your own charts, graphs, and tables. List management lets you select, sort records of variable information to be printed into standardized formats, so you can individualize mailings, for example. The spelling checker is on a Merriam-Webster dictionary, not on a spellings' but

And if that's not enough, it's packed in a format that also accepts other software like Lotus 1-2-3.

**The better you know SAMNA, the more you'll get out of it.**

With SAMNA, you can use functions with a few keys or can be prompted. So as you become proficient in use, you can go directly from one function to another without going

pull-down menu to select your next keystroke. It's as if SAMNA were thinking along with you, staying one step ahead of what you need to work faster. And with help like that, you *will* work faster.

**All of this, plus. It could only be SAMNA +.**

Start with SAMNA's incomparable word processing powers. Add the increased productivity of SAMNA's exclusive Seamless Integration™. Then you'll see how the integrated interactive features will help you change the way you work. SAMNA is the only software that can do all this and more.



## FEATURES

|   | SAMNA WORD II | SAMNA WORD III | SAMNA + |
|---|---------------|----------------|---------|
| Alternate Keyboards—Foreign languages, Greek Math, special symbols  |               | •              | •       |
| Column support to move, copy, delete or insert  |               | •              | •       |
| Column support for newspaper style printouts  |               | •              | •       |
| Copy to buffer or file and insert in new location   |               | •              | •       |
| Move to buffer or file and insert in new location   |               | •              | •       |
| Stored paragraphs accessible by i.d.  |               | •              | •       |
| Automatic index generation (alphabetized and with page references)  |               | •              | •       |
| Five function math  |               | •              | •       |
| Full pathname support for all file functions  |               | •              | •       |
| Merge lists of letters in background while working on screen  |               | •              | •       |
| Print wheel changes in middle of text   |               | •              | •       |
| Proportional print  |               | •              | •       |
| Section/outline number in three styles  |               | •              | •       |
| Automatic generation of Table of Contents   |               | •              | •       |
| User defined functions to record and/or play back commands  |               | •              | •       |
| Wildcard support for all file functions   |               | •              | •       |
| Proof for spelling errors and hyphenation—automatic corrected options provided—Merriam-Webster dictionary   |               | •              | •       |
| Automatic Merge—with selection and sort capability  | •             | •              | •       |
| List management—up to 99 fields, unlimited length, selection and sort capabilities  | •             | •              | •       |
| File back up—two versions   | •             | •              | •       |
| Disk/Directory back up  | •             | •              | •       |
| Bold mode or for revision—displayed on screen   | •             | •              | •       |
| Center mode or for revision—displayed on screen   | •             | •              | •       |
| Caps mode or for revision—displayed on screen   | •             | •              | •       |
| Justify mode or for revision—displayed on screen  | •             | •              | •       |
| Underline mode or for revision—displayed on screen  | •             | •              | •       |
| Super mode or for revision  | •             | •              | •       |
| Sub mode or for revision  | •             | •              | •       |
| Double Underline mode or for revision   | •             | •              | •       |
| Required page break   | •             | •              | •       |
| Connect line mark—prints two lines as one   | •             | •              | •       |
| Connect space to prevent words from being separated   | •             | •              | •       |
| Move cursor forward by word, line, paragraph, sentence, page and file with ◀▶ arrows.   | •             | •              | •       |
| Move cursor backward by word, line, paragraph, sentence, page and file with ◀▶ arrows.  | •             | •              | •       |
| Go to edges of screen, specified phrase, other file, particular page  | •             | •              | •       |
| User defined defaults for back up, sheet feed, default drive/directory, print wheel sequence, default keyboards, decimal positions in math, negative number display, color graphics, use of color on color monitors | •             | •              | •       |
| Delete forward/backward in shaded amounts, file(s) from disk  | •             | •              | •       |
| DOS 2.0 support for directories and sub-directories   | •             | •              | •       |
| Direct typing from keyboard to printer—bypass screen  | •             | •              | •       |
| Display up to two files simultaneously  | •             | •              | •       |
| Rename, copy, delete files without closing document or returning to DOS   | •             | •              | •       |
| Repage with widow/orphan control, exact paragraphs, exact lines   | •             | •              | •       |

## FEATURES

|   | SAMNA WORD II | SAMNA WORD III | SAMNA + |
|---|---------------|----------------|---------|
| Search and replace with case and attribute consideration  | •             | •              | •       |
| Fold wide documents to compare columns  | •             | •              | •       |
| Exits to operating system   | •             | •              | •       |
| Zoom—miniature page display   | •             | •              | •       |
| Up to 300 footnotes of unlimited length   | •             | •              | •       |
| Multiple formats stored with file   | •             | •              | •       |
| Up to 30 headers and footers per document, unlimited length, option to alternate  | •             | •              | •       |
| Three levels of help—for each function—progressive and contextual   | •             | •              | •       |
| Automatic paragraph indent  | •             | •              | •       |
| Insert text from keyboard as you type, from a stored glossary or from a file  | •             | •              | •       |
| Line drawing  | •             | •              | •       |
| Change pitch and line spacing in middle of document   | •             | •              | •       |
| Number alignment un decimal or comma  | •             | •              | •       |
| Overstrike characters or lines  | •             | •              | •       |
| Auto paging at input with displayable page breaks   | •             | •              | •       |
| Auto page numbers at choice of location and starting number   | •             | •              | •       |
| Insert and place markers for form fill in   | •             | •              | •       |
| Queue up to five print jobs   | •             | •              | •       |
| Print a block of text from screen, page from screen, file from disk   | •             | •              | •       |
| Print in background while working on screen   | •             | •              | •       |
| Protected text from printing on two pages   | •             | •              | •       |
| Scratchpad for typing and printing without saving on disk   | •             | •              | •       |
| Translate ASCII files to use with Samna or Samna files to ASCII   | •             | •              | •       |
| Vertical center lines on page   | •             | •              | •       |
| Initial support   | •             | •              | •       |
| Extended support  | •             | •              | •       |
| 800 number  | •             | •              | •       |
| On screen disk based tutorial   | •             | •              | •       |
| Illustrated reference manual  | •             | •              | •       |
| Easy, seamless entering and exiting between spreadsheet and the word processor  |               |                | •       |
| Multiple spreadsheets in one document—floating cells embedded in text, spreadsheets linked, floating cells linked to any spreadsheets in document.                            |               |                | •       |
| Alpha-numeric naming for spreadsheets, columns, rows, ranges, or cells  |               |                | •       |
| Uses cells or ranges—relative and/or absolute references to cells or ranges.  |               |                | •       |
| Full complement of mathematical operators, automatic alignment of numbers   |               |                | •       |
| Full support of date functions for aging purposes, including use of DOS date  |               |                | •       |
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| Insertion, deletion and movement of columns or rows, and erasing or copying ranges, columns, rows, and cells to include formulas  |               |                | •       |
| Specifies ranges, columns, rows and cells via shading or with coordinates   |               |                | •       |
| Protects ranges, columns, rows, cells or entire spreadsheets  |               |                | •       |
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# IN DEPTH

An interview



CW PHOTO BY JAKE KIRCHNER

## August Bequai, fighter for ethics

Washington, D.C., attorney August Bequai seems always to be in several places at once. Whenever the conversation or deliberation turns to white-collar and computer crime, Bequai is somewhere close by. When not lobbying for computer crime legislation, he is working on numerous book projects and firing off strongly worded letters to publications ranging from obscure journals to *The New York Times* in his campaign for stronger laws and codes of professional conduct.

By first impression, Bequai is a slightly Runyon-esque figure, quickly making friends amidst a stream of anecdote-sprinkled conversation. Despite his familiarity with the seamier side of the high-tech revolution, Bequai has not allowed crime, asocial behavior and what he sees as the gradual dissolution of civilized society to dispel his faith in humanity. His most disarming quality is that he knows absolutely everybody.

The former chairman of the Federal Bar Association's White-Collar Crime Subcommittee, Bequai sits on the advisory board of the *Journal on Media Law and Practice*. He has served as an adviser on technology and law matters to the Congress, the White House, the Office of Technology Assessment and the Justice Department. An architect of the Federal Computer Systems Protection Act, he has advised Florida, Maryland, Minnesota, New York and other states on computer-related legislation. He is the author of several well-received books, including *Computer Crime, White-Collar Crime: A Twentieth Century Crisis*.

Bequai was interviewed in his offices recently by *Computerworld* Washington Bureau Chief Jake Kirchner on a number of topics covered in a work-in-progress tentatively titled *High-Tech Terror*.

**You have said you think the technocrats are taking over or are threatening to take over. Can you explain what you mean by that?**

If you look at history, you will find that 500 years ago, those in power were often people who controlled land and access to land. They were replaced by the merchant class, which basically controlled the flow of trade. They controlled shipping, who sold what to where and the trade routes. Then, in the 19th century, you had the industrial class — the industrial magnates, well into the 20th century. And their power base was capital — the control of capital.

As we increasingly become an informational society, I think it's fair to say that we will see — and are already witnessing, by the way — the rise of what I call the informational elite. This is not to say that the other elites are going to be supplanted; they'll still be around, but you will have a new elite with a new power base and an important base — the flow of information.

The thing I think we have to be careful about is that we understand the process, that we understand the informational elite and that we take steps to constrain its behavior, to ensure that it will be constitutional, within the framework of our present political system and that the informational elite does not — either



## IN DEPTH/AUGUST BEQUAI

through arrogance, vast control over information flow or what have you — subvert the democratic process.

#### Who are the informational elite?

The informational elite aren't any one class. They can be men and women from various strata of society. They can be people who occupy important positions within governmental agencies, men and women who run the computer centers — men and women who control the flow of information, whether it be over electronic funds transfer systems, telecommunications, what have you. It's basically a technocratic elite, an elite whose power base is connected to the electronic revolution.

**Do they realize or will they realize that they are an elite? And if**

*Our universities these days don't concentrate sufficiently on the humanities. I don't think we sensitize many of our technocrats to codes of ethics. We don't sensitize them to what white-collar crime is or to the way the political process operates.*

**they do, what are the ramifications? Will they temper their behavior, or will they be tempted to use their power in ways we might object to?**

I don't think that some of these people realize they are in fact the upcoming informational elite. Second, I don't think that "members," if you will, of that group are necessarily committed and devoted to the

interests of society at large. If the flow of information is to be controlled by men and women in the private sector and the governmental sector for their own end purposes, then it is not in the interests of society at large.

I think it's fair to say that our universities these days don't concentrate sufficiently on the humanities. I don't think we sensitize many of our technocrats to codes of ethics.

We don't sensitize them to what white-collar crime is or to the way the political process in this country operates. A lot of people graduate from universities in this country with absolutely no grasp of history. And if you were to talk to them about feudal Europe, for example, and 17th century England and the roots of democracy, they'd have no idea what you were talking about.

**So you're concerned that a new kind of asocial behavior might be developing.**

Exactly. I think [they have an] obsession with technology — they're not taking technology and placing it in some sort of larger framework. Where does it fit? I think one of the things we have to be concerned about, obviously, is the abuse of information.

As we increasingly become a cashless society, those computers are going to store all types of information on you and me, all kinds of interesting pieces of information.

I'm a lawyer. I deal with criminals most of the time; that's the nature of my practice — and they tend to be sophisticated criminals. When you deal with them you find out that information is power, that information lends itself to blackmail, that information gives you a profile of the other person, tells you what that other person is all about, what he or she thinks.

But even more important than that, what we're talking about is manipulating human behavior. We are becoming a society where people who have the magic mailing lists of potential donors or supporters, people who can raise the money to influence people out there can manipulate the electorate. They can increasingly buy the vote electronically.

So what we're witnessing is an elite that can exercise more and more power because of its control over vast information resources.

**It seems to me you're talking about two problems. On one hand, you're saying there is a situation arising where some people could cynically manipulate the new informational power...**

Well, it happens. It isn't just some; a day doesn't go by that you don't hear horror stories if you talk to people who deal with information, whether it be in corporate America or the governmental sector.

**On the other hand, there is another class of technocrats who by their jobs and their backgrounds are developing power that will be used in a way we might not like. It might have results that are counter to democracy or individual freedom, but they don't know that or are not concerned about it.**

They are not sufficiently refined in the way they employ power. The point I'm making is that I think you have a lot of people in the "technocratic establishment" who have a lot of power and aren't fully aware of the impact and potential of that power. And if they do abuse it, in some instances it may be by innocence.

**But isn't that the problem that is in the long term of more concern? Because the white-collar criminal and people who are now using**

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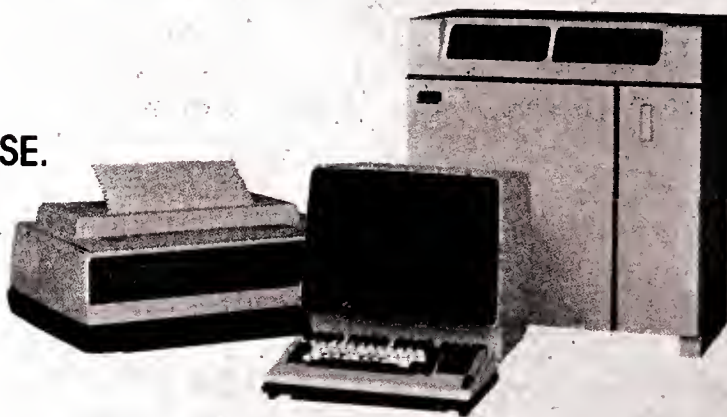
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## IN DEPTH/AUGUST BEQUAI

information, electronics, to gain money or services or votes, if they are actually breaking the law and if we knew how, could be brought to justice.

The other group is growing very quickly as technology grows in importance, and it might present us with a world where individual freedoms are compromised before we are able to stop it.

If in fact you have abuses by that group, two things are going to happen. One, the group could begin to take steps to regulate itself — codes of ethics, industry self-regulation. And I don't see that happening now. The other side of the coin is that a lot of other people out there aren't really crazy about the technocratic elite in this country. They see their own power base and their own vested interests threatened.

#### Such as labor unions.

Labor unions, yes. And some of the religious fundamentalist groups who view technology with horror — and there is some legitimacy to that. Some of the grassroots populists, some of the politicians — the political machine types who view the technocratic elite as supplanting their power base. After all, if you have your computers and your telecommunications systems, your electronic message systems, why then have a party structure? Why the need for political bosses?

The military, in part, wants to utilize the technology for its own purposes, in this case for national defense.

So if a number of different elites out there begin to feel threatened and if they pool some of their resources, you're going to see some stringent regulations in the coming years in this area. Just like with the nuclear industry.

#### What kind of regulations?

You might see a Federal Trade Commission-type agency take action.

#### To regulate computer use?

To regulate computer use, the exchange of data, licensing, perhaps, people that use computers. I can see that happening in the coming years at the federal, state and local levels.

**If there is a developing technocratic elite that is, perhaps inadvertently, dangerous, wouldn't some sort of regulation be the natural way to deal with that?**

Not at this stage. I'm willing to sit back and witness where the technocratic elite is willing to go. If the technocratic establishment poses a threat to fundamental democratic institutions of this country, then I say yes, they should be controlled and regulated.

**Do you think they will or can pose a threat?**

I don't know if they *will*, but they *can*.

**When and how could that happen?**

I think it's a question of the next 10 years. It's a question of seeing what happens, what evolves, to see if you have the establishment of codes of ethics, if in fact the professional organizations in this area begin to take active steps to police

*You can go out today and buy information on anybody. And the likelihood of being prosecuted, I might add, is rather remote, because prosecutors don't really see these types of offenses as serious crimes — not yet, anyway.*

their members, provide education, things of that sort.

**Are you talking about privacy and security measures, for example?**

Well, you have that small core of criminals. Self-regulation isn't going to do anything for those types. They're going to go on stealing money, copying mailing lists and what have you, irrespective of what you

or I or anyone else out there says. What's going to deter them are large fines and prison terms.

But when you deal with the larger segment — that ignorant segment, if you will — they don't realize that it may be a violation of state law in some instances to alter and gain access to medical records, to copy mailing lists, to sell them or that it may be a violation of federal law to gain access to consumer records. I think

that group can and should be educated and sensitized to the fact that they do exercise a lot of power and that power has to be employed judiciously and in the interest of society at large.

**Would you say there are already problems?**

Sure, there are lots of problems in this area, and you have an emerging and rapidly growing market in stolen information. You can go out today and buy information on anybody. And the likelihood of being prosecuted, I might add, is rather remote, because prosecutors don't really see these types of offenses as serious crimes — not yet, anyway.

**Looking somewhat farther down.**



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the road, if this technocracy does in fact develop and there are no controls on it, no self-control or government control, do you see a potential for a situation in which a person could use the technology for his own gain, for political control, maybe even in some sort of totalitarian regime?

I don't see the technocrats becoming the Big Brother party, the 1984 crowd. A totalitarian system rests on various pillars. One of them is ideology. It's a secular religion, whether it be on the right or the left. Second, you have a party that often isn't made up of technocrats but true believers. The technocrats are employed by the true believers to transform society in accord with the dogma that the party follows.

*What I do fear is not that the technocrats are going to become tomorrow's totalitarians; some of the technocrats I've run into are too cynical for that. I do fear that elements with totalitarian inclinations — emotion, if you will, rather than logic — may use the technocrats as vehicles for supplanting the present political process.*

What I do fear is not that the technocrats are going to become tomorrow's totalitarians; I frankly think that some of the technocrats I've run into are too cynical for that. I do fear that elements in this country with totalitarian inclinations — emotion, if you will, rather than logic — may utilize the technocrats as

vehicles of supplanting the present political process. I don't see that happening in the next couple of years, by the way.

**You're talking about ideology. Isn't it possible that it could be more of a profit-motive totalitarianism?**

But that really doesn't fall into the definition of a totalitarian system. A totalitarian system constitutes an amalgamation of technology and ideology. Ideology is the prominent force. Now by ideology, the totalitarian ideology talks or centers itself about the creation of a secular utopia. You have a clergy, you have a heaven and earth, but they're all here on earth and there's a promise of a better world, and there's the oppressed class and all that.

I don't see the technocratic elite developing that kind of dogma. People that are given to the profit motive are very reluctant to take the other step, the true believer step. The true believer doesn't care about profit. Profit is secondary to him. He doesn't care about wealth; he cares about dogma.

We've had people with totalitarian inclinations and totalitarian ideological commitments since antiquity. What they lacked in the past was technology. The religious zealots in the Middle East, Europe, Asia and East Asia had that totalitarian mentality. They wanted to transform society entirely into the vision they had of what man and woman should be. They lacked technology.

The 19th century changed all that. The turn of the century made it possible for the state, armed with technology, powerful technology, to in fact transform human behavior. That's what 1984 is all about. And the technocratic elite, I think, lends itself as a vehicle.

**There are certainly countries that are totalitarian now that could take advantage of that technology.**

Well, they have. Take a look at the Soviet Union. Lenin, Stalin, Beria, Krushchev and all the others used the technocrats to ensure the rule and governance of the party. Same thing with China. Technocrats are tools, the pawns of that kind of system.

**Getting back to our situation, you don't see a totalitarianism based on technocracy developing anytime soon. But isn't it possible there could be a change in the political winds — for instance if the U.S. is engaged in some kind of war, either limited or nuclear, or there is a great security threat? At such a time, perhaps even with the consent of the people, the government might restrict individual liberties, even if only to a relatively small extent. And if that happens, the government could very easily use the technology we are developing.**

Totalitarian systems don't just jump over the fence. You need a traumatic event or a series of events that cause the societal fiber to disintegrate, and then you've got to have someone else come in and take over.

**Such as Russia following the First World War.**

Sure. I think it's safe to say the Bolsheviks would never have come to power, not in the 20th century, had tsarist Russia not gone to war, fallen and fallen disastrously. In that case you have two factors: you have a war that so traumatizes Russian society that it actually starts to disintegrate, the army disintegrates, the cities disintegrate, the economy is shattered. And people are looking for the new, the promised, the salvation.

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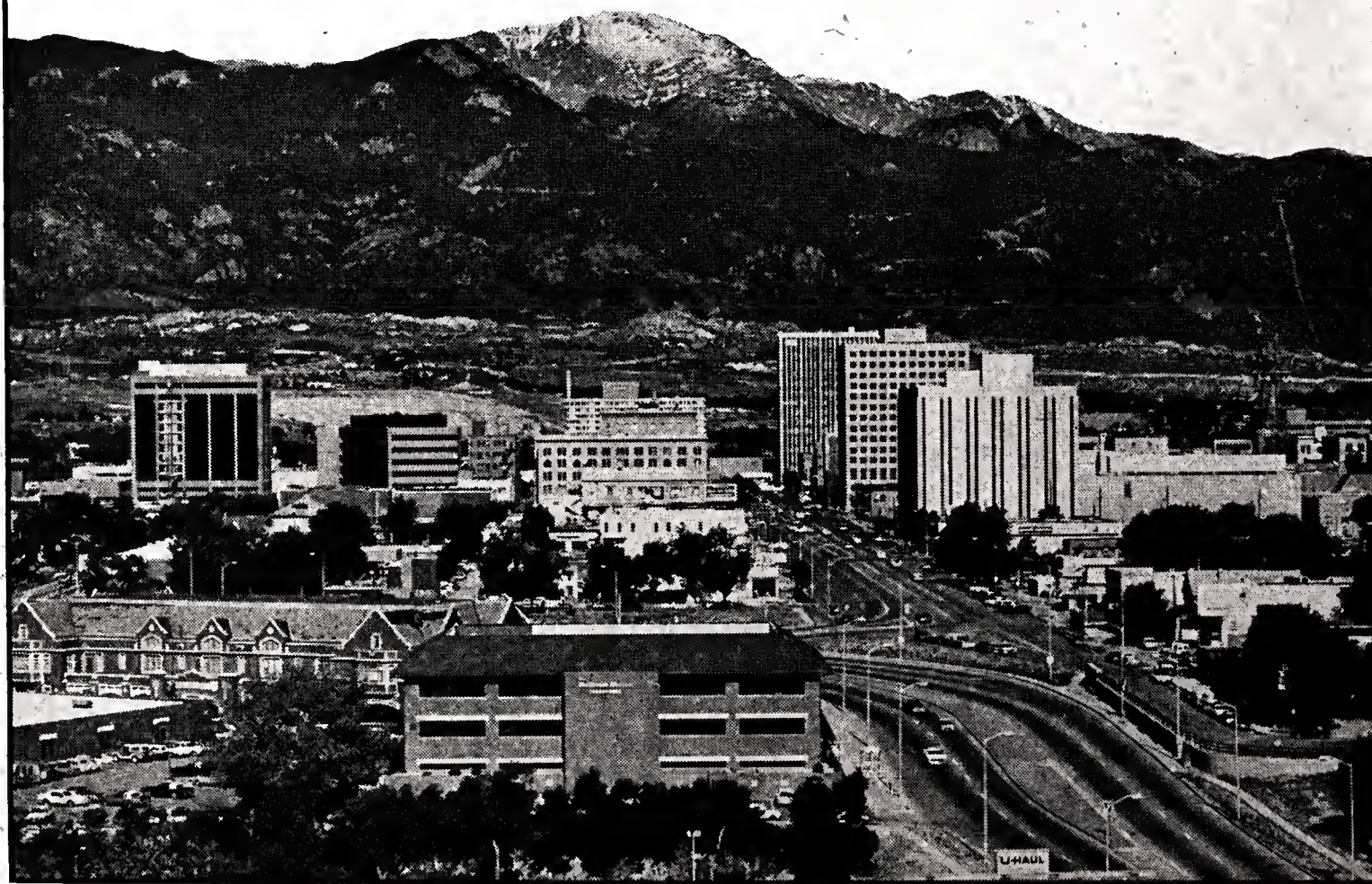
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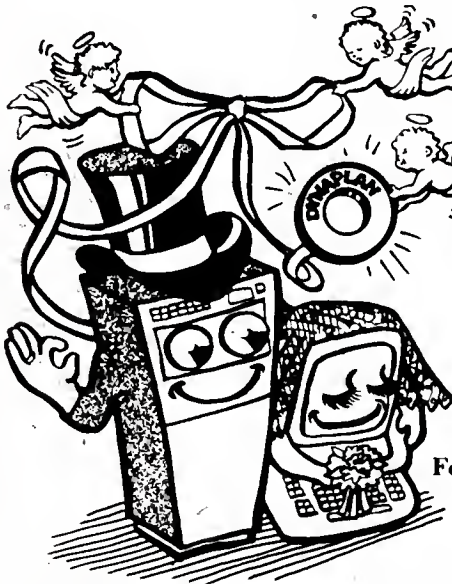
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## IN DEPTH/AUGUST BEQUAI

*I see a political process that in many respects is rather inept, frozen. As you well know, it's very difficult to get Congress to do anything. We haven't even gotten a computer crime bill on the books yet, and we've been going at it for seven or eight years.*

Technology made it possible for the Hitlers, the Stalins, the Mussolinis to impose a police state on the citizenry of those countries. In the 19th century you could go to the barricades and fight your Hitlers as people did against the kings of Europe.

In the 20th century, with the advent of the tank, modern weaponry, modern communications, radio, telegraph, telephone, airplane, it became

impossible to resist the totalitarian state.

**Getting back to the U.S., do you see the possibility of something along those lines, perhaps not as severe, happening in this country?**

Well, I see a couple of things happening. I don't see our long-term economic problems going away. We have a national debt now that's a black hole. Second, I don't see how this country can remain competitive in all markets overseas forever and forever; you just can't do it. Other great civilizations have come and gone. I see us losing our technological lead to the Japanese. We have some real political problems in Latin America that I don't see going away for a long time to come. I don't see problems in Southern Africa going away. I don't see the dependence on Middle Eastern oil going away.

I don't see any long-term policies, and I don't see any formulation of long-term policies. I see a political process that in many respects is rather inept, frozen. As you well know, it's very difficult to get Congress to do anything. We haven't even gotten a computer crime bill on the books yet, and we've been going at it for seven or eight years.

The political process in this country, especially at the federal level, is a system of "do nots." It's very difficult to get anything done, but it's very easy to block. I see small vested interests blocking legislation, blocking governmental action. I see a lot of groups more interested in their own little picture of the world rather than the national view. So I think we've got some problems, and we're going to have some more.

**Well, what could happen in this country?**

I think that if we get a severe economic situation — I don't want to use the term "depression," because it is reminiscent of the '30s — but if we suffer some severe economic and political setbacks, especially in Latin America, I can see somebody on a white horse coming along and saying, "Hey, I will restore America to total grandeur." By the way, that's what Mussolini said in Italy: "I will restore the Roman Empire."

I can see somebody coming along and saying, "I will make sure everybody has a job. The technology that took your jobs away? Why, we're going to deal with that, too."

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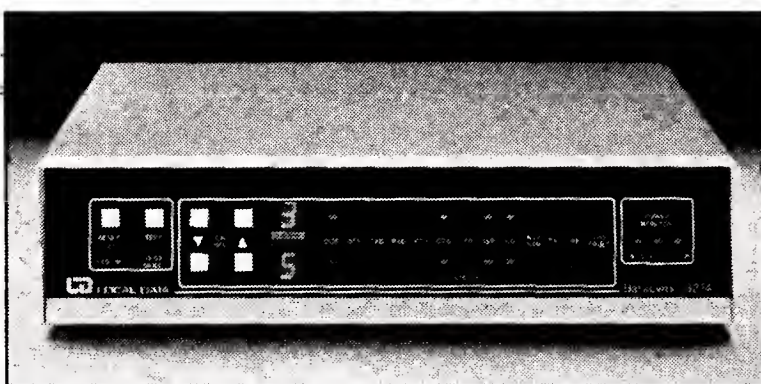
**Would this have to be outside our normal political process or could it be perhaps a president with a compliant Congress — maybe not a real dictatorship but just a violent swing away from the**

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## IN DEPTH/AUGUST BEQUAI

## present political situation?

Well let me just add some of the other things this person could promise. The crime issue is very, very powerful. A lot of people are concerned about crime, white-collar crime and especially street crime. The illegal alien problem isn't going away. A lot of people, especially the unemployed, blue-collar unemployed, are very sensitive to this issue.

If you look at history, and history does repeat itself, Hitler, Mussolini, even Lenin, came to power through the elected process. Sure, they rigged the elections in some instances, but they were able to get themselves and their parties into power through the elected route. Why? Because in Italy the army wasn't going to allow Mussolini and his Black-shirts to pull a coup d'etat. Same thing in Germany. So they used the traditional route and once in power, then they employed technology — radio, mass communications, telephone, telegraph, the technology they had available to them at that time — to ensure that their power would be there to stay.

And yes, I see that possibility. If we're going to get a dictatorship in this country, it's going to come, at least initially, through the accepted political process. Someone would come into power saying we're being threatened by terrorists, terrorists are out to destroy this country, criminals have taken over the streets, things of that sort.

Let me give you an example. Imagine for one second, if you will, a band of terrorists armed with nuclear devices holding New York City, Chicago and L.A. hostage and imagine a man or a woman in power at the White House who really isn't that concerned about the constitutional process. What difficulty would that person have in getting all kinds of bills through Congress, doing all kinds of things to ensure the survival of the country against this terrorist?

But according to your theory, the danger would be after that, when he comes to Congress and says we have to make sure this doesn't happen again.

Exactly. That's what Hitler did in Germany. The Reichstag fire. He said the communists have burned down the Reichstag; we now have to pass all sorts of laws to make sure it doesn't happen again. And he did.

In a situation like that, how specifically could the information technology that we are developing be used by that person or groups of persons?

Well, if you take a look at the Polish example, everybody said Solidarity is too well organized, too well entrenched, there are 10 million of them. The Polish government can't take them on; it doesn't have the army, and it doesn't have enough police to crack down on Solidarity. What the Polish government did was to control the flow of information. It shut down telephone, telegraph systems, the trains and every-

thing else. People weren't able to communicate.

In our society, everything's computerized. Control those computers and you make sure I can't make a telephone call, I can't communicate with you to do anything about the impending doom. You can very easily do that.

Because everything is so highly automated, it makes it much easier for a central

government to control.

Yes, pretty much you can control what they see, what they say, what they hear.

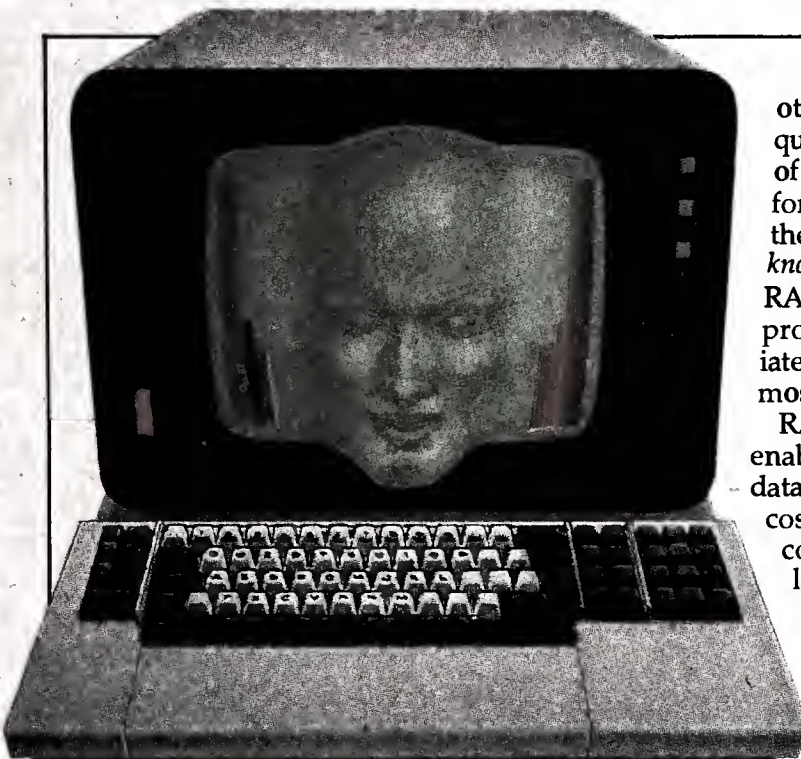
It seems to me, then, that there are two processes you have to worry about. One is the development of technology that I think you would admit is in many, if not most, respects a good thing.

Yes it is. I'm for technology.

The other side is a political question. If there is a political problem, the technology will be there in a certain number of years to help some power control the country.

Yes. What I'm saying in essence is that it is a tool. If in fact the country falls into difficult times and a group of individuals decides to go beyond the constitutional process, the vehicles are there

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## IN DEPTH/AUGUST BEQUAI

*A lot of people don't trust the government. They have very little confidence in Congress, in their elected officials. They're very concerned about the future of the country. I think the political process, if it faces a severe challenge, a severe test, may not meet it.*

for those individuals to use — the police computers are there, the FBI computers are there, telephone computers are there. And you can use that awesome technology, those vast data banks, to do anything and everything you want.

Do you think that the technology is making it more likely that something like this will happen or just that if it happens, this

group or individual would be more successful?

Both. I think it makes it inviting and it makes it possible. Tempting and possible.

It seems there would be two areas that you would want to address if you were indeed worried about this. One is defending the political process, which this country has successfully done for 200 years.

Well, you know, 200 years isn't a lot of time in history.

And the other area would be possibly taking some steps to make sure that the technology is not so inviting — a political and technical problem.

If you look at the history of this country and compare it to the history of Great Britain and some other civilizations, we're really youngsters. Athenian democracy was around for several centuries. So what? They lost it. Roman democracy was around for several centuries and then they got Nero, Caligula and some of the other "emperor gods," as they called them. The point I am making is that nothing is infinite. I think it's fair to say that because we haven't had problems in the past doesn't mean we're not going to have them.

I think the fundamental safeguards are education and ethics. An ethical society has very little to worry about. An unethical society has a lot of problems.

The thing that does scare me is that whenever you talk to people in the political process, they say "money, money, money." If you've got money, you get elected. You don't have money, you don't get elected. It's sort of reminiscent of ancient Rome near the collapse. People were out there buying senate seats; they didn't get elected anymore, they just went out and bought them. And I see the same thing happening. The fact that you employ technology to win the consensus, to be the nice guy, doesn't change the fact that you have to have the bucks to gain access to that technology.

And if you go around the country you find that a lot of people are turned off by the political process. A lot of people don't vote. A lot of people don't trust the government. They have very little confidence in Congress, in their elected officials. They're very concerned about the future of the country. I think the political process, if it faces a severe challenge and a severe test, may not meet it.

Do you see a certain critical timeframe in which changes should or must be made?

This is going to be a critical century in our history. Technology is moving rapidly; it's giving the state awesome powers. We have a technocratic class and people in government who are not criminal but amoral. They feel that they don't have to play within certain bounds. They don't even think about it.

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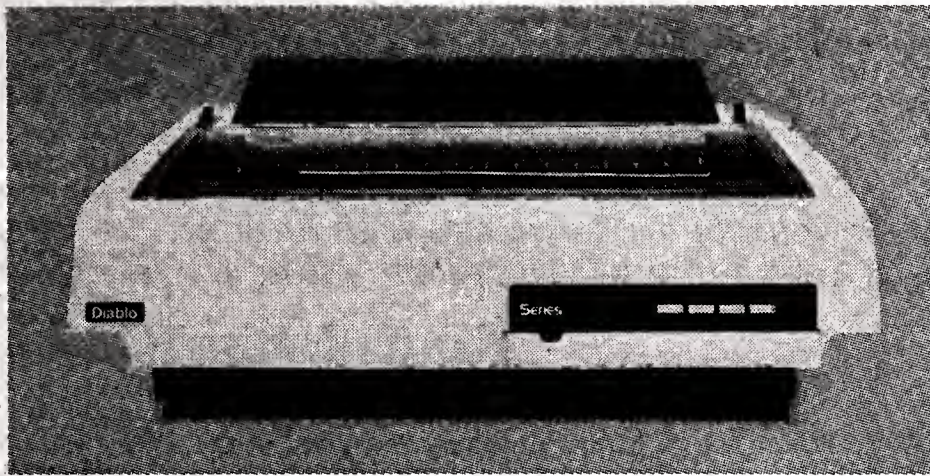
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## IN DEPTH/AUGUST BEQUAI

campaigns of computers to target voters and specialized polling that can be targeted to neighborhoods and special constituencies on the state and regional level is an example of this problem? Or is this just an effective use of technology?

I see it as an example of the eroding process. What we're doing in essence is packaging a candidate for the masses out there and at the same time affecting the public's perception. We're changing, modifying their behavior and then making this candidate fit.

Are you sure we aren't just modifying the candidate's behavior so he can more ably represent the constituencies out there?

No, I really don't think so. It's

*No, I don't see technology enhancing political participation. What it has done, and is going to do increasingly, is concentrate power in fewer and fewer hands, in the hands of the people who have it, in the hands of the people who have the money.*

gotten to the point where people now run for four and eight years to get elected president. I think if you talk to people out there, you find that the process is hurt because the average man and woman says, "Look, if you've got the computers, you've got the mailing lists, you've got the pollsters and all that, you can elect a monkey to office."

And I hate to say it, but it's true. If you've got the right bucks behind

you and the right people behind you and the right organizations, you can elect an imbecile to Congress. And there's quite a number of imbeciles in Congress.

The other side of that — and it's an argument that's often made — is that technology, by increasing the common man's access to various kinds of information and services, is increasing individual free-

doms, widening the power base. With that in mind, couldn't you say that if a candidate is spending eight years on the stump, he at least is out there talking to people and learning what they feel, whereas in the past all a candidate had to do was plug into the political power bases — perhaps unions, state legislatures — and get elected that way and never have to worry about what the people thought? Isn't a person who's running for national office for several years really being exposed to the will of the people?

Well, he is and he is not. You have the absence of the human contact. At least the unions, the local machines, local politicians, were responsive to the populace; otherwise they wouldn't be there. They dealt with the local people; they had contact with the local people. They knew the needs of their neighborhoods. You don't have that anymore.

There is talk now that Mr. Reagan is going to spend \$100 million to get reelected president. That's just pure insanity. What's the next one, \$1 billion?

What we're seeing in essence is that offices are up for sale and you need the technology to get elected because the other guy's got it and you need the bucks to buy that technology. And I will go a step further and say to you that no, technology does not enhance political participation. A lot of people can't afford it. A lot of people in this country are hungry; they don't have the money to go and buy a personal computer.

So the bottom line is no, I don't see technology enhancing political participation. What it has done, and is going to do increasingly, is concentrate power in fewer and fewer hands, in the hands of the people who have it, in the hands of the people who have the money.

But let me go a step further. There is a danger. The danger is that if the populace loses confidence in the system, if the populace says elected office is up for sale — and that happened in ancient Rome, Greece and other great civilizations that have come and gone — then we're in trouble in America. Because the man on the white horse can come and say: "Listen, I will restore your powers, I will give you security. I will give you things that you had once. I want to give you democracy back."

In terms of what we do about it, you mentioned that society should be better educated, that the technologists should realize the larger environment, that there should be codes of conduct...

— absolutely, codes of ethics.

... and that there are certain laws that could be passed, computer crime legislation on the federal level, for example. What can you do in terms of the development of technology? Should you step in and not allow one centralized communications network or say that computers should not be allowed to store certain kinds of information?

No, No. I'm all for letting the marketplace govern what computers are going to be used for, provided they're not used for illegal purposes. Twenty-three states now, for example, have computer crime laws on the books. Some of those laws make it a crime, a felony, to steal and abuse

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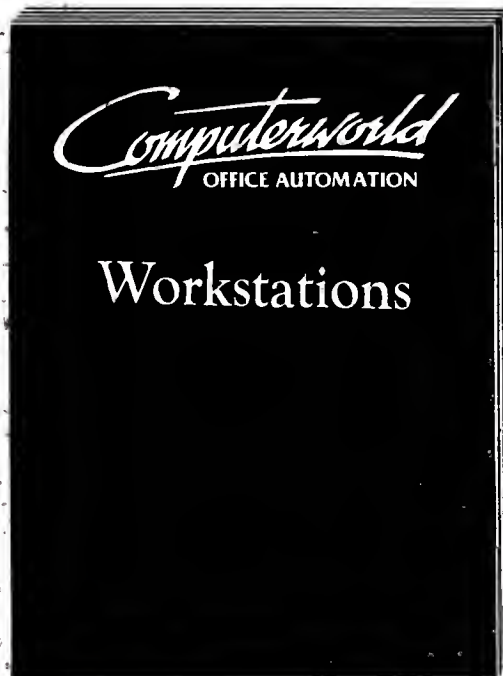
# If you miss the next 3 issues of CW Office Automation, look at the issues you'll miss



## August

In this issue we'll look at microcomputer and word-processing software, using product reviews and case histories. Plus, we'll show readers how to decide which products meet their current and future needs.

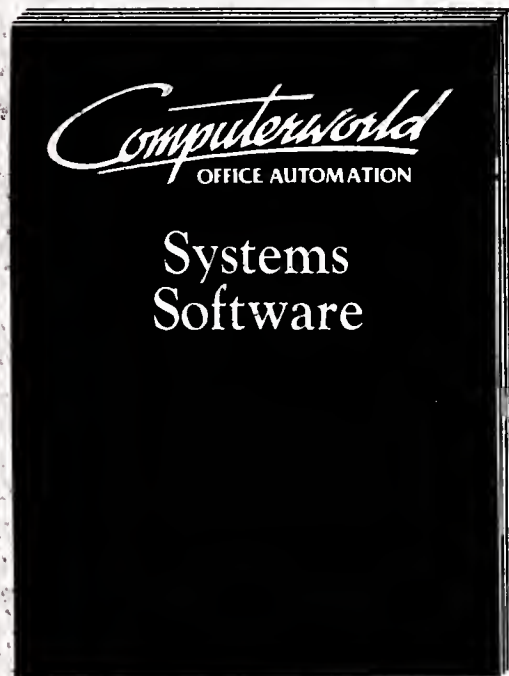
**Closes: July 6**



## October

Readers will get the latest on integrated workstations and word processors. We'll make product comparisons, evaluate systems, and examine equipment capabilities. And we'll discuss hardware compatibility, hardware upgrades, and cost-justification ideas.

**Closes: August 31**



## December

Coverage includes: user interfaces, natural languages, data bases, decision support systems, information centers, and artificial intelligence. Also, we'll highlight user solutions and vendor trends as we consider the current and future benefits of systems software.

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## IN DEPTH/AUGUST BEQUAI

data. A number of states have laws on the books that deal with medical records. If you gain access to medical records and you alter, modify them, what have you, you can be prosecuted.

So I see changes, but I think with legislative changes must also go changes in our attitudes, changes in our ethics. The bottom line is, we have to ask ourselves, "Technology for what purpose?"

**Who do you see asking that question?**

I see myself asking that and I see a lot of people like me asking that. Technology for what purpose?

**Do you see a trend, perhaps within the universities, that this is a**

**question that is being asked?**

Yes. The American Political Science Association, for example, has asked me to speak at one of their panels at the national conference. And I see a lot of business groups asking the question.

The point is, technology is a vehicle. We shouldn't become enslaved to that vehicle; we should not confuse our ends with our means.

Technology is a means. The objective is the betterment of society.

**You mentioned federal computer crime legislation. Do you think the Congress is ever going to catch up with the technology curve so that it can take action in a timely, intelligent and effective way and not in a crisis have to rush to legislation that is perhaps hastily drawn?**

Congress sort of reminds me of the fellow that didn't do his homework for a whole year and then the night before the final exams sat down and tried to cram it all in, with the result that he came out with a D.

**Do you see that changing?**

No. The computer crime legislation illustrates my point. You have two or three members of Congress that have been sitting on it for a couple of years. They don't think it is important.

A lot of groups think it's important. A lot of members of Congress think it is important, but these individuals have managed to lock it in subcommittee. I really believe they don't feel it is necessary. It's a sad indicator of the political process in

this country. What it says is that one member of Congress can lock up a key piece of legislation that a lot of different groups out there feel is necessary and lock it up for many, many years. And there's very little you can do about it.

**Is there one key member who is doing that now?**

Well, I think Congressman Don Edwards (D-Calif.), chairman of the House Judiciary Subcommittee on Civil and Constitutional Rights has done a good job of locking it up in his subcommittee. It's no secret.

**You realize he has several concerns, including the state/federal jurisdiction question.**

Well, those are his concerns. They're not shared by 200-and-some-odd members of Congress; they're not shared by a lot of people out there. They're not shared by 23 states. I'm fully aware of his concerns. The point I'm making is that it is a good illustration of how one man with his concerns can lock up an important piece of legislation.

It shows also that it is very difficult for government, especially at the federal level, to formulate any policies, especially in the high-technology area, which is really important. I don't see any leadership coming from Washington in this area. And I might add I don't see any leadership coming from the industry in this area.

I just see a lot of people out there who want to make a lot of money and who couldn't care less how they make the money.

**You said earlier that you don't see any kind of totalitarian takeover using technology, in the near future at least. But you have talked about a number of problems and trends that concern you. Would you describe yourself as pessimistic about technology in the future?**

No, I would describe myself as optimistic. That's why I do my writing, my lecturing. I believe in the ability of men and women to change things. I believe that most have the ability to surmount things.

I think in large part the problems we now face are the result of mediocre leadership, corporate and private and in the public sector. I don't see any new ideas coming either from the public or private sector in this area.

I don't see anybody pushing really strongly for codes of ethics, which I think are very important, for self-regulation.

I don't think Washington has all the answers. I don't think you need an FBI agent and an IRS agent under everybody's bed. I think the industry has to sit down and it's got to ask itself: "Somewhere down the line unless we do something, what's going to happen?"

And what's going to happen is what's happened to other industries. It happened to the securities industry in the '30s, and it happened to the nuclear industry in the '60s and '70s. In the '50s, the nuclear industry was the thing of the future; look at it today.

Unless the industry, the high-tech sector of the economy, begins to assert some leadership, formulate some policies and assume some responsibility in this area, I think we are in trouble.

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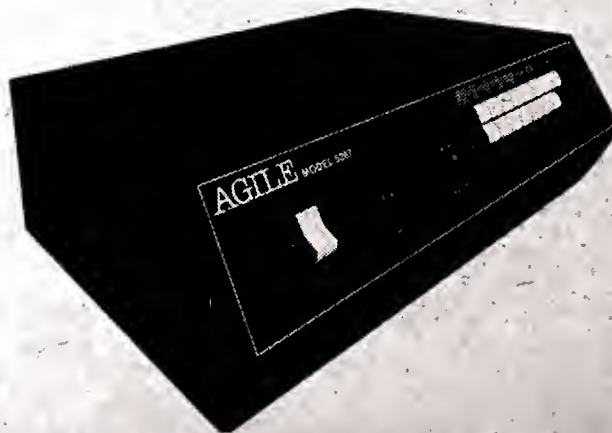
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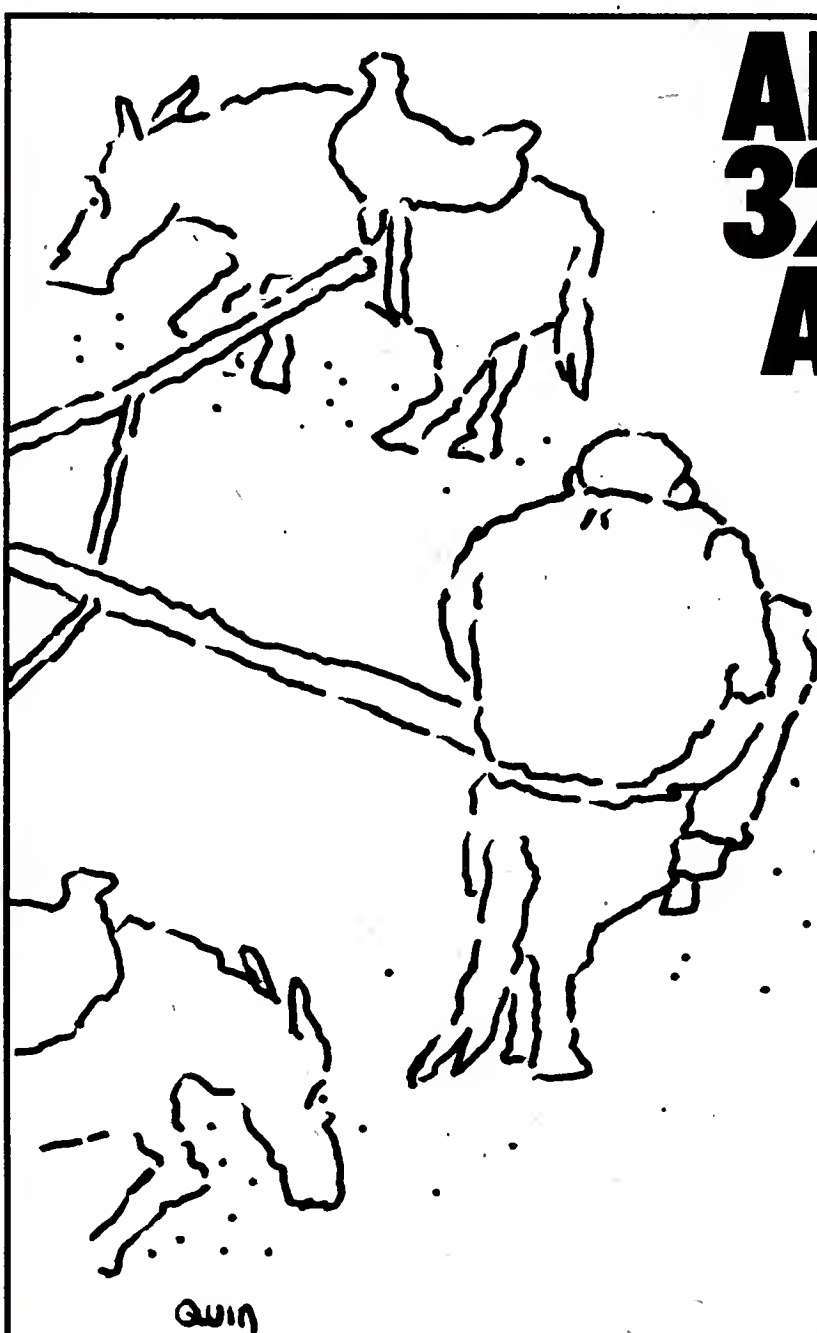
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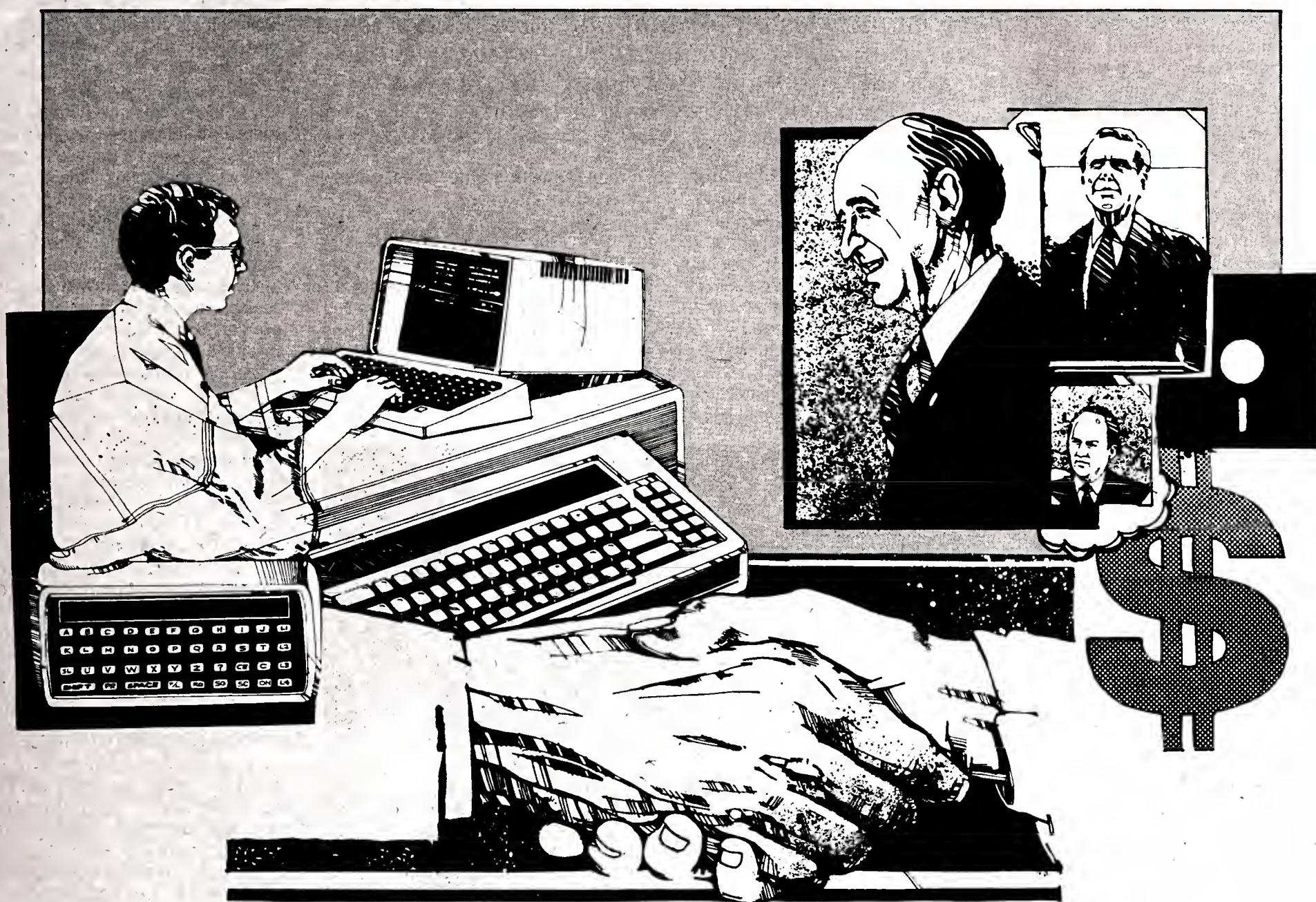
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# IN DEPTH



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## Working the human side

---

***Engineering methodologies and humanistic management cannot merge quickly, just as effective teams with dedicated members cannot take shape overnight.***

---

**By William D. Harrison**

It pays to work the problems on the human side of engineering.

How many times does engineering management face a project leader who has come to announce that a key module will be four weeks late? Management then has two alternatives: Seek retribution or instill motivation.

Managing the people who build software involves more than understanding software methodology or estimating algorithms. The successful manager is also a master at understanding the people who build the software; their behavior can be more important to a project's success than the correct development methodology.

Skill in working the problems on the human side of engineering is not a genetic gift; it is simply a matter of learning some techniques and applying them. Several areas of behavioral psychology, particularly the works of Abraham Maslow and Douglas McGregor, can help managers solve humanistic problems in engineering.

Although many factors contribute to a project's success, the one with the most impact is commitment to objectives. How can this commitment be obtained? Maslow, the author of *Motivation and Personality*, wrote of a need theory (safety ego self-fulfillment), which tells us what must happen if people are to be committed to



## IN DEPTH/WORKING THE HUMAN SIDE

our objectives. The following set of conditions should apply:

- They must believe in the company and that the company's policies are based on a sense of fairness.

- They must believe in you and that your practices are based on a sense of fairness.

- They would like to believe the management chain from you to the chairman of the board is solid in terms of technical skills and commitment to fair play.

- Evidence of the above must exist — for example, in pay policy, promotions and working conditions.

- They must believe you will give them a certain amount of responsibility and an opportunity to use their creative skills to make a contribution to the project's success.

- They must believe you and the

*Commitment to objectives is a powerful concept. Consider the state of mind of one of your people when he pursues a personal objective. There is no question about whether the objective will be achieved — only of how much energy must be expended to reach that goal.*

company are committed to helping them work through their problems.

Commitment to objectives is a powerful concept. Consider the state of mind of one of your people when he pursues a personal objective. There is no question about whether the objective will be achieved — only of how much energy must be expended to reach that goal.

When those people are committed

to management's objectives, success is virtually ensured.

#### Emerging hierarchy

Most managers would like to believe that if 12 people are needed for a project, you simply advertise for and hire 12 people. Productivity is assumed to be at a maximum on Day 1 or shortly thereafter.

In reality, however, significant

problems must be resolved before those 12 people can turn into a productive team. The first problem — the hierarchical structure of the relationships among people — is immediately worked, whether management knows it is going on or not.

Each person starts out assuming his abilities are superior to those of his peers (Maslow's social and ego needs). These 12 people spend a significant amount of time discovering each other's talents and building areas of mutual respect. This whole process can begin and end without management being aware of it.

In some cases, however, the process cannot be worked out. Two people can be similar in skill level and talent; as a result, a natural conflict will exist and remain in place permanently. Management becomes aware of the problem as objectives are missed.

Major problems sometimes occur when management picks a group leader who is in conflict with the natural de facto hierarchy. A mature team of individuals who have worked together for a number of years has a distinct advantage over a new team put together for the first time. A price must be and will be paid to resolve ramifications of social interaction.

#### Project phases and Maslow

The chart on ID/18 illustrates a project's various phases and the basic skill levels required over the project's life. At the beginning, the need for analytical reasoning and interpersonal skills is high.

In the requirements phase, a project is essentially dedicated to understanding the customer's problems and stating the requirements for a solution. During this phase, knowing what microprocessor will be used is usually not very helpful.

As the project progresses in time, the need for fundamental analysis skills decreases, and the need for technical skills increases. As we approach the programming phase, we should know the customer's problems and the requirements for the solution. In the programming phase, knowing what microprocessor will be used and what its characteristics will be then becomes crucial.

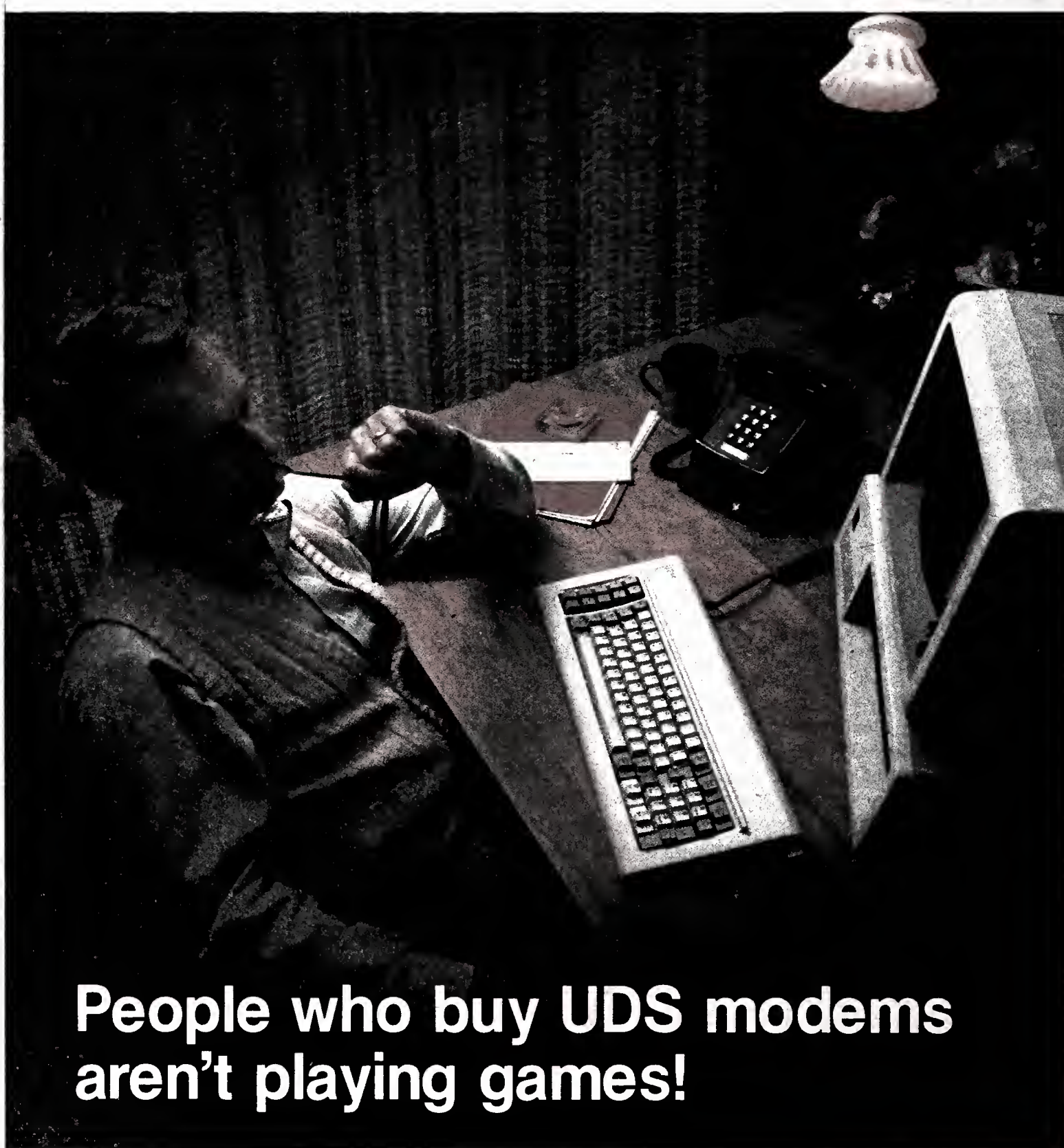
As each project phase is completed, a knowledge base of the project is built, which each phase draws upon. The programmer must draw upon structured design knowledge; the structured designer must draw upon requirements analysis and so on.

#### Nucleus of people

A project works best when a nucleus of senior people is assigned from beginning to end. If a problem is found during a systems test, one must know a lot of answers: Is the solution acceptable to program standards? Does it violate the structured design philosophy? Is it in agreement with requirements analysis?

This type of organization (as compared with division of labor) also provides the best opportunity for fulfillment of ego needs, according to Maslow, and is in the direction of self-actualization. As a result, this organization has a high probability of success.

Each phase of a project is like a microcosm that is born, lives and dies. At the middle of a phase, a team has solved the initial problems of starting the phase and has learned the fundamental aspects of that




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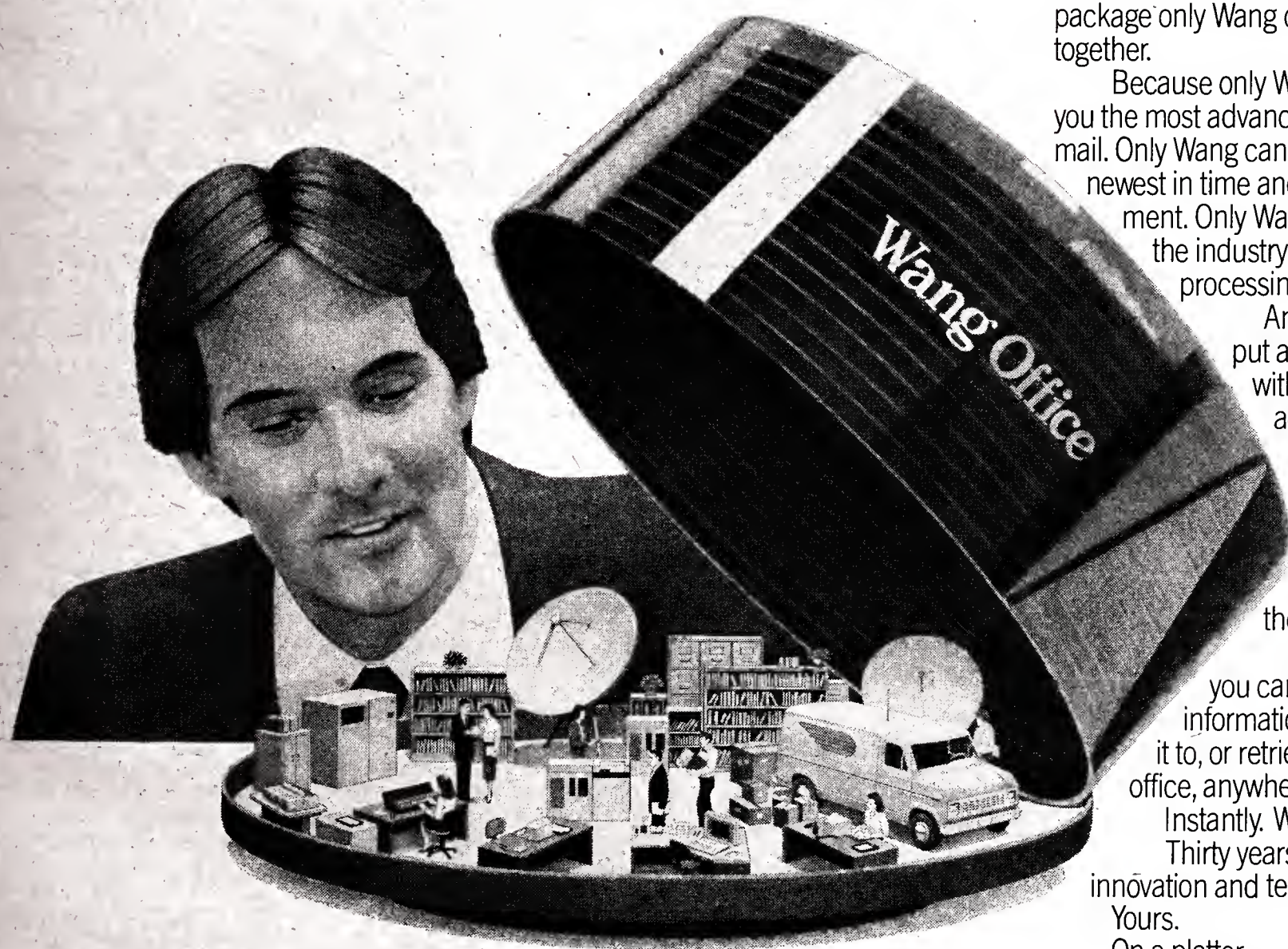
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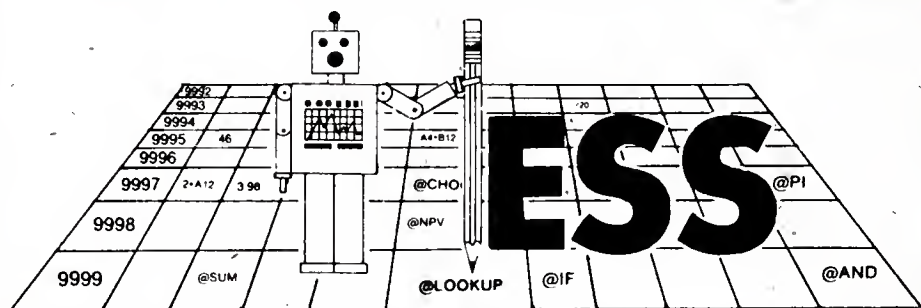
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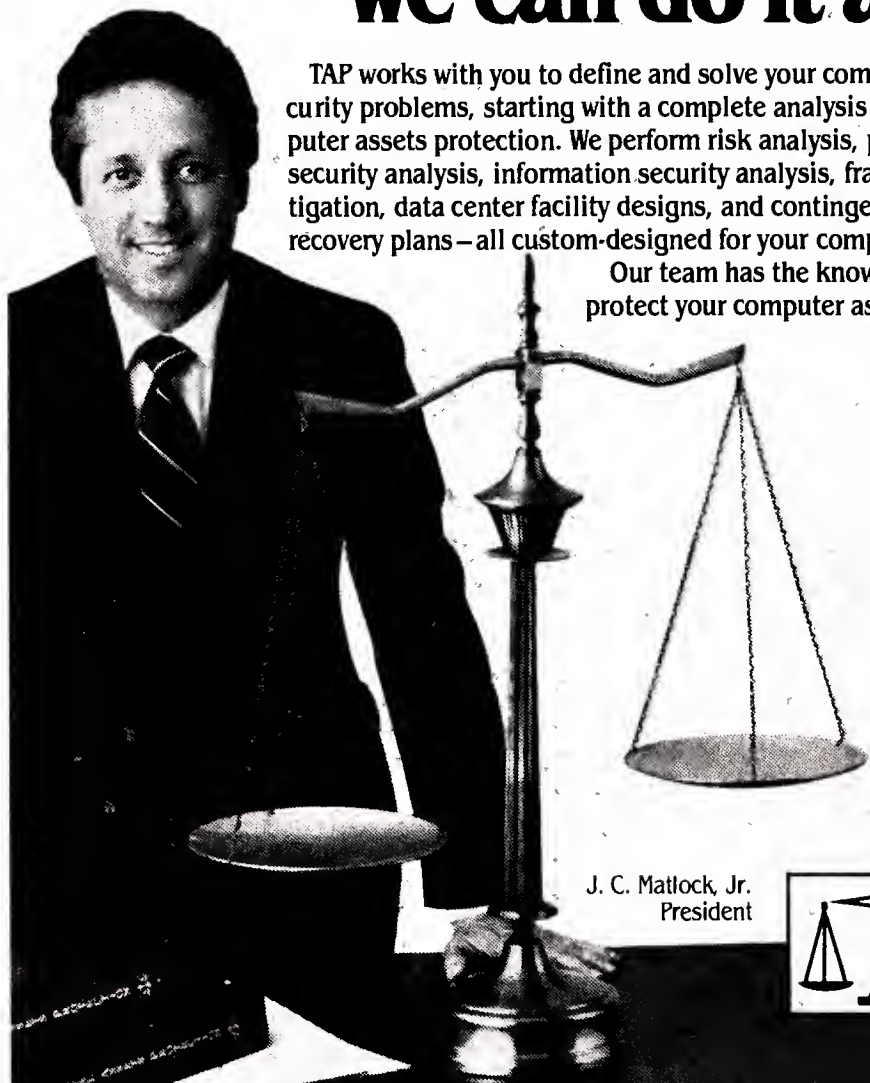


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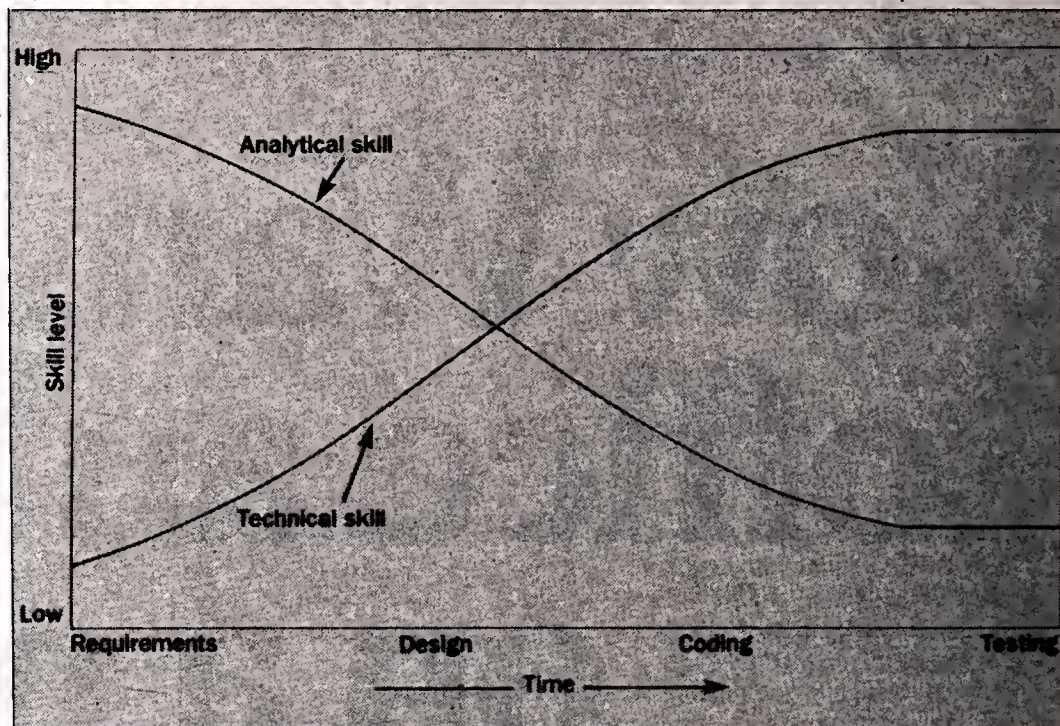


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## IN DEPTH/WORKING THE HUMAN SIDE



Project phases and skill levels

phase. When a team is in the middle of a phase, it is enjoying the fruits of its efforts. Team members are contributing in a positive way, as well as generally satisfying needs for ego building, social status and so on.

The next phase looms as a threat. The team may be weak in the skills required for that phase (analytical vs. technical). Years may have passed since team members exercised those skills. If new people have been assigned to the next phase, new relationships must be formed. Many psychological factors are in place to make the team working on Phase 1 resist going to Phase 2.

What helps? Management can pave the way for the beginning of each phase. When the project is in the requirements phase, discussions can be held on structured design. When the project is in the design phase, classes can be held in programming the particular microprocessor or system. The more we promote discussion of the next phase, the smoother the transition will be. Probe activities seem to have a high payoff.

Observation of successful projects seems to indicate that we must attempt to avoid a step function between phases. Rather, the attempt should be made to structure mental activity into a continuum. When management does not address the problem, it runs the risk of a requirements specifications phase that never ends — except by management decree.

### McGregor's X and Y theories

The starting point for addressing this problem consists of a set of fundamental beliefs or assumptions about people. Douglas McGregor, author of *The Human Side of Enterprise*, illustrated two different views of man when he developed two theoretical constructs on the nature of man in relation to his work. He called one Theory X and the other Theory Y, names chosen arbitrarily as neutral designations.

The assumptions in Theory Y are optimistic and humanistic. They also reflect, for McGregor, an unlimited potential for personal and organizational growth. Theory X represents a static and somewhat pessimistic view of the nature of man; Theory Y emerges as dynamic and amenable to the changing nature of organizations and individuals.

If man behaves toward his work in the manner assumed in Theory X, according to McGregor, the organiza-

tion — not the employee — is at fault. People are not basically lazy, indifferent, uncooperative or uncreative. The negative behavior of Theory X is essentially created by management through its excessive degree of control.

### Style X management

When Style X management is applied to an engineering department, the following generally occurs:

- A fear of failure predominates. In the short term, the person works harder, but fear of failure keeps him from taking a chance. In this environment, creativity or any deviation from the norm becomes a risk.

- People adopt an attitude that says, "I am probably as bad as they say I am; these things I want to do will probably not work."

- Each person believes there is no point in trying harder; the boss will push when it is necessary.

Software is largely a mental activity. It is very difficult to force a person to think faster by using external pressure. A person who wants to think faster, however, can easily do so; if thinking faster becomes necessary to meet an objective to which he is committed, he will do it.

If we are going to work the problems on the human side of engineering, one serious risk must be avoided: A new manager can confuse Style Y management with "soft" management. They are not the same.

In reality, Style Y management generates tremendous pressures on all involved — pressures that, stemming from being committed to objectives, are far greater than any that can be imposed externally by a Style X manager.

### Software engineering

In the 1950s, programming meant writing machine instructions in the form of actual numbers — a slow and tedious activity. On the positive side, because it took so long to program something, plenty of time was available for human interfacing and communications. The penalty for making a mistake was extremely high; subroutines could not be relocated easily. The pressure on a programmer then was similar to that on a hardware engineer today. Circuit boards are not easily changed.

The computer came to the rescue in the form of assemblers, macros, linkers and high-level languages. The productivity (coding rate) of a programmer was multiplied by several factors. Penalties for making an



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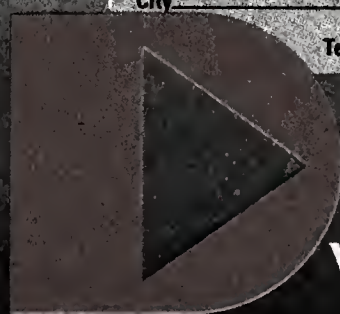
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## TOUCH SCREEN

PROGRAM SOURCE LISTING

```

1  IDENTIFICATION DIVISION
2  PROGRAM IDENTIFICATION
3  ENVIRONMENT DIVISION
4  SOFTWARE SECTION
5  SOURCE CODE FOR TOUCH SCREEN
6  OBJECT CODE FOR TOUCH SCREEN
7  DATA DIVISION
8  UNRECORDED FOR
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END OF SOURCE PROGRAM

## LANGUAGES

ASSEMBLY LANGUAGE

| Line | Code | Label | Text             |
|------|------|-------|------------------|
| 1    | 0000 | START | START OF PROGRAM |
| 2    | 0001 | END   | END OF PROGRAM   |
| 3    | 0002 | DATA  | DATA SECTION     |
| 4    | 0003 | CODE  | CODE SECTION     |
| 5    | 0004 | END   | END OF PROGRAM   |

PROGRAM NAME: TOUCH SCREEN

## SPREADSHEETS

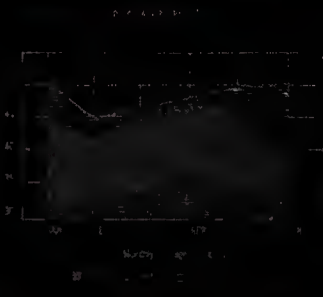
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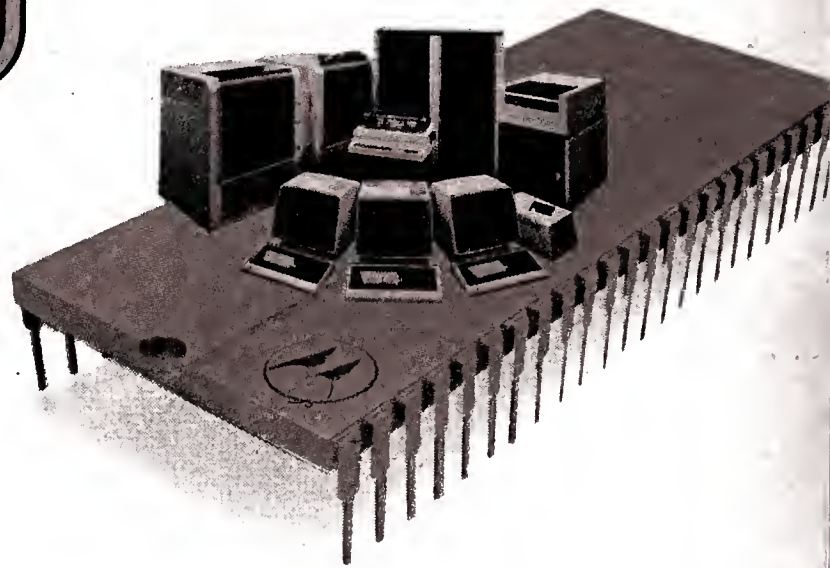
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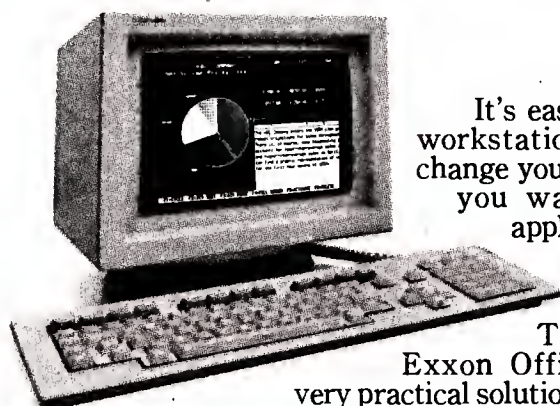


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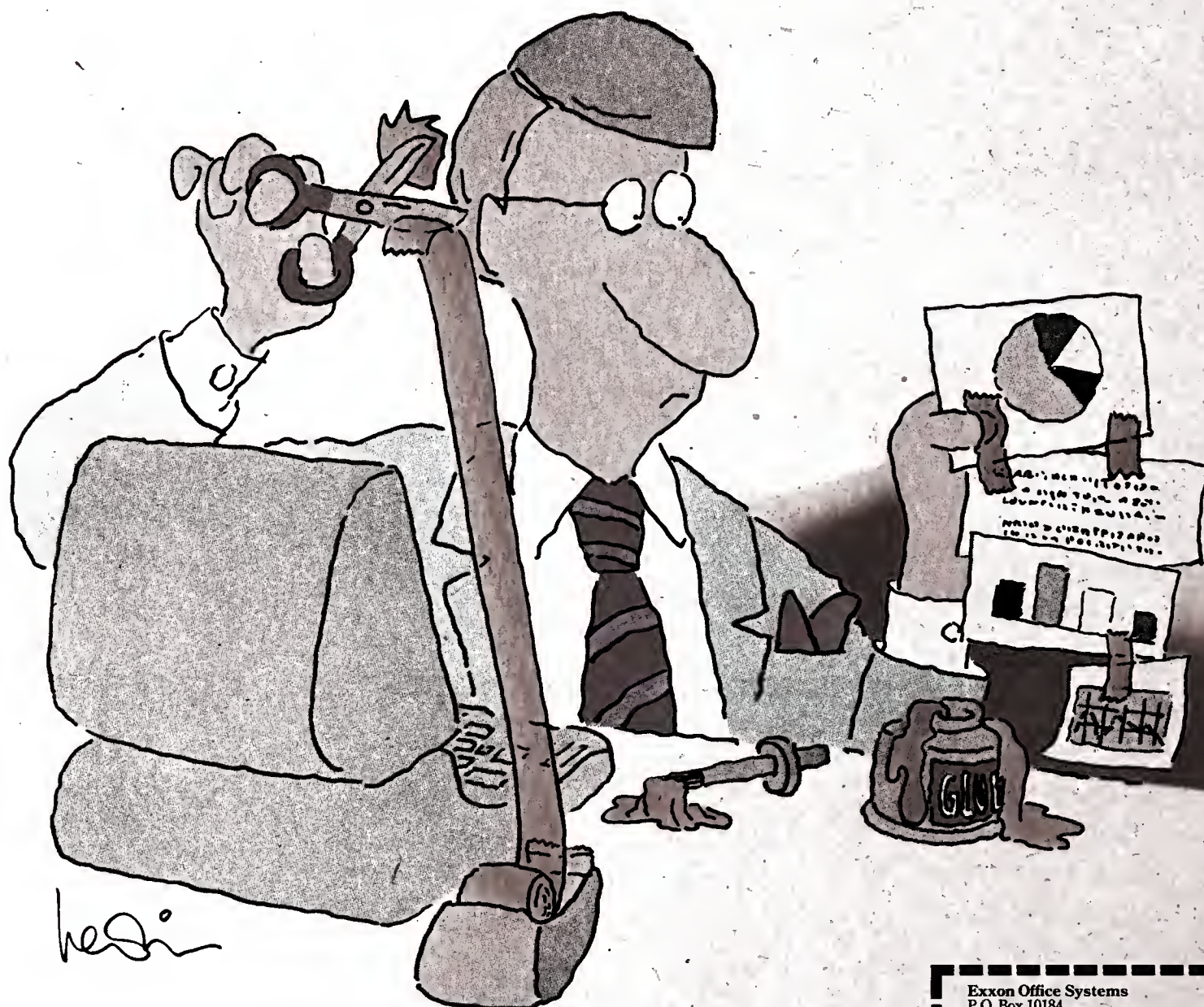
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## IN DEPTH/WORKING THE HUMAN SIDE

*Management found it very hard to relate to what Mills said. He talked about teams, motivation, relationships of people on the team and the right people for the job. It was all very humanistic. Management could not get its arms around what Mills said.*

error were greatly reduced. Subroutines could be recoded or relocated overnight.

As productivity increased, however, the time available to discuss modules, subroutines and interfacing decreased. Programmers were given little time to understand the overview of the project. Management wanted to get on with the business at hand — programming.

This was the birthplace of the scenarios that became familiar to software management. All software projects took too long and cost too much. Worst of all, management's fundamental fear was that a project might never end or, if it did, it might not do what it was supposed to do.

In the early '70s, two significant events occurred:

- In an IBM journal, A. Mills published an article that described a project that was not only successful, but also claimed to have achieved an astounding productivity rate.

- Constantine and Meyers published articles in the IBM journal and detailed structured design methodologies.

Management found it very hard to relate to what Mills said in his article. He talked about teams, motiva-

tion, relationships of people on the team and the right people for the job. It was all very humanistic. Management could not get its arms around what Mills said.

#### Pyramid approach

On the other hand, most managers related very well to what Meyers and Constantine said about blueprints. Draw the blueprint before you lay any bricks (code). A tremendous amount of management support and dollars were provided to structured design methodology. The bottom line was that it worked, but most of all, there was now some assurance that a software project would finish and would come close to doing what it was supposed to do.

That was the beginning of what is sometimes called the great pyramid approach: Know where every brick goes before any bricks are laid. It is regrettable management did not pay more attention to what Mills had to say.

The problem with the great pyramid approach is that, pursued to the nth degree, it falls into the classical rut of Style X management. Creativity is stifled, and management is subject to an adverse reaction stemming

## Theory X and Theory Y

Douglas McGregor called his two theoretical constructs on the nature of man Theory X and Theory Y.

Theory X is identified as management's conventional conception of harnessing human energy to organizational requirements. Theory X assumptions include:

- The average human being has an inherent dislike of work and will avoid it if he can.
- Because of man's dislike of work, he must be coerced, controlled, directed or threatened with punishment to get him to put forth adequate effort toward the achievement of organizational objectives.
- The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition and, above all, wants security.

#### Extreme positions

McGregor further stated that the assumptions that comprise Theory X have caused management to conceive of its mission in terms of two extreme positions: "hard" management or "soft" management. He dismisses both of them as neither wrong nor right, but as irrelevant.

McGregor's construct of Theory

Y was based on the accumulation of knowledge about behavior and motivation that has emerged within this century. Theory Y is the embodiment of a set of assumptions about people and is quite different from traditional management philosophy. The assumptions include:

- The expenditure of physical and mental effort in work is as natural as play or rest.
- External control and the threat of punishment are not the only means of getting people to work toward the organization's objectives. People will exercise self-direction and self-control toward achieving objectives to which they are committed.
- Commitment to objectives is a function of the rewards associated with their achievement (esteem, self-actualization).
- Under proper conditions, people learn not only to accept but to seek responsibility.
- Most people are capable of a relatively high degree of imagination, ingenuity and creativity in solving organizational problems.
- Under the conditions of contemporary industrial life, the average person's intellectual potentialities are being utilized only partially.

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## IN DEPTH/WORKING THE HUMAN SIDE

from X management. Managers have a tendency to count the number of modules coded and punish the guilty accordingly.

Structured design works and it works well. The challenge is to make it work in a humanistic environment and to gain the productivity McGregor and Maslow claim is there.

We must build our teams and departments the way Mills did, using McGregor's and Maslow's work as a guideline. We must build teams of mature people whom we trust to determine the methodology that should be applied, the level of programming standards that are adequate, the time when it is safe to code a structured subsection and the tactics that will bring the project safely through the next phase. These groups of committed people will carry the project

*Management has a natural tendency to preserve the status quo by implementing procedures and policies. This very attempt to preserve the status quo, however, begins to weaken a department.*

through to success.

Merging the concepts of engineering methodologies and humanistic management cannot be done quickly, just as effective teams with dedicated members cannot be formed overnight.

#### Life cycles, organizations

The idea of life cycles applies to many things. Arnold Toynbee introduced the idea of life cycles of civilizations and nations. In essence, he said civilizations are born mature

and begin to die.

The manpower staffing curve of a project very much resembles Toynbee's curve, which can also be applied to an engineering department.

An engineering department is a living organization. The death of that living organization occurs when management retreats behind layers of procedures, policies and methodologies that attempt to regulate the life of the organization in minute, day-to-day detail. Humanitarian considerations are suppressed, creati-

ity is stifled and motivation is reduced.

Under these conditions, an inevitable drift toward Style X management begins. In general, this leads to the attitude, "We've been doing it this way for years, why should we change?" The department obviously doesn't die; it just loses its ability to be competitive. The company may die.

It is easy to fall into this trap. At maturity, a department is competitive. Management has a natural tendency to preserve the status quo by implementing procedures and policies. This very attempt to preserve the status quo, however, begins to weaken a department. A department is a living organization — the synergistic sum of the talents and skills of all the human beings who make up its entirety. These people constantly change and grow. Senior people will (and should) outgrow the department and move on to bigger things. New people will join the group and must be assimilated into the culture.

Management's role is to facilitate the growth of the department and the people within it. In that role, management must make provisions for the integration of new people into the social order of the department. Management must also realize that a department is a living organization and define and facilitate a culture that can interact with humanistic needs. Today's procedure will not solve tomorrow's problems.

One could take the viewpoint that work is the cement that binds the social structure together. From this perspective, the work must be accomplished; failure to complete it is a threat to the common social structure.

#### Meeting the challenge

I recently sat in the front seat of a new Japanese car and was very surprised to discover I could not find a flaw in its workmanship anywhere. It was as close to being perfect as it could possibly be.

I was struck with the thought, "All of the people who worked on this car were committed to the objective of building a perfect product." The challenge was clear. We must compete with products that we assume will be manufactured perfectly.

The U.S. automobile and electronics industries currently face the challenge of competing with products manufactured with a very high level of quality. The introduction of quality circles shows they understand the problem.

Today, we are the greatest software developers in the world, but our competition has shown they have the ability over a period of time to master complex technologies such as software. We, too, will face the challenge of competing with products that appear to be perfect.

What causes people to be committed to a product's success? The answers may lie in management methodologies and their orientation to humanistic behavior — in other words, working all the problems on the human side of engineering.

#### About the author

William D. Harrison is a senior project manager with Burroughs Corp. in Mission Viejo, Calif. He was formerly a manager of engineering development at Honeywell, Inc. in Irvine, Calif.

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The Practical Impact of Emerging Software Technologies

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From planning to personnel management, from the central computer to the desktop

### Spring Schedule

|                    |                    |                                      |
|--------------------|--------------------|--------------------------------------|
| <b>A</b> —April 24 | <b>B</b> —April 25 | Philadelphia, PA, Bellevue Stratford |
| <b>A</b> —May 23   | <b>B</b> —May 24   | Chicago, IL, Knickerbocker           |
| <b>A</b> —June 5   | <b>B</b> —June 6   | Los Angeles, CA, Hyatt Wilshire      |
| <b>A</b> —June 21  | <b>B</b> —June 22  | New York, NY, Hilton                 |

**MARTIN MARIETTA**



# MICROCOMPUTERS



MICRO BITS

THOMAS MADRON

## Workstation needs still unmet

**A**n executive workstation should provide managers and professionals with a productivity tool that assists them in coping with the information requirements of organizational life.

Unfortunately, a truly useful executive workstation has not been developed. Since microcomputers can be tailored to individual needs, they present major advantages as executive workstations. The workstation should use a standard operating system and include a specific list of software that is available off the shelf and does not require extensive programming.

The software should allow the novice to access facilities of the workstation in a simple and straightforward fashion. Menus, whether they use words or icons, represent one method to accomplish this task.

See MENU page 99

*Madron is manager of computer services at North Texas State University, Denton, Texas.*

## Firms opting for integration

### Managers accept need for multiple packages

By Paul Korzeniowski  
CW Staff

**BOSTON** — Corporate microcomputer managers seem willing to support more than one of the recently announced integrated software packages.

That message was delivered by microcomputer managers after Lotus Development Corp.'s Symphony and Ovation Technologies, Inc.'s Ovation were demonstrated here at a recent meeting of the Boston chapter of the Microcomputer Managers Association (MMA), a users group of corporate microcomputer managers.

"Since users are very interested in these products, I think we probably will support both of them," stated Frank Chiacchieri, office systems analyst at Bank of New England here.

Integrating spreadsheet, data base management, communications, graphics and word processing functions, the products could fill the needs of two types of users, managers predicted. "Ovation seems to be easy to use and could be helpful for a novice user," said Naomi Karten, manager at Blue Cross/Blue Shield of Massachusetts. "Symphony seems geared to the experienced power user."

However, the vendors must ship these unfinished products before these managers can determine which package to approve.

Originally scheduled for release in January, Ovation's target shipping date has been pushed back to October 15. "The program is written in C, and the company has

had trouble finding programmers familiar with C," one microcomputer manager said.

For the first time, Ovation publicly demonstrated a working version of its product rather than a demonstration. Although the version did not include data base capabilities, the company plans to ship the software to its beta test sites in a few weeks.

"Lotus will ship Symphony on July 4, if not earlier," predicted Jane Lenson, corporate accounts sales engineer at Lotus. Since announcing Symphony in February, Lotus has been fine-tuning the product and is currently testing the 20th version of Symphony.

Another program that has been shipped, Visicorp.'s Vision, has met with little enthusiasm in the corporate community. "We tested Vision, but it was extremely slow," one manager said. "We just couldn't offer it to our users; they would hang us."

Symphony, Ovation and Vision represent three of the myriad products designed to allow users to integrate data.

"There are two methods to integrated products: windowing and an all-in-one package," said John Bosley, national sales manager at Ovation. "Windowing products tend to present a cluttered appearance; the more windows used, the more cluttered the screen becomes. Some windowing packages use different commands in different windows and sacrifice a common interface."

The MMA is located at 80 Boylston St., Boston, Mass. 02116.

■ Business and Professional Software, Inc. introduces a graphics package that creates overhead transparencies/86

■ Convergent Technologies, Inc. implements Lotus Development Corp.'s 1-2-3 package on its Ngen workstations/86

■ Televideo Systems, Inc. adds an expansion box for its line of IBM Personal Computer-compatible machines/86

### INSIDE

Board-Level Devices/87

Auxiliary Equipment/89

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Communications/100

## Suppliers aim to make IBM's PCjr a business tool

### Vendors offer products to turn PCjr into full-fledged IBM micro

By Jim Bartimo  
Special to CW

Businesses will soon be able to buy from independent vendors equipment that will turn IBM's PCjr into a full IBM Personal Computer — and save them anywhere from \$1,000 to \$3,000 of the cost of a comparably equipped IBM Personal Computer or Personal Computer XT.

Third-party hardware manufacturers have developed products to answer common criticisms of the PCjr, including its lack of adequate random-access memory (RAM), a full-stroke keyboard and a second disk drive. In addition, a few companies are about to offer products that may boost the PCjr's capabilities beyond the level of a full IBM Personal Computer.

These suppliers perceive the PCjr not as a high-priced home computer, but as an IBM Personal Computer waiting to be born.

For the time being at least, this flood of additional equipment for the

PCjr is being blessed by IBM, which published the technical specifications and stated that the use of these add-on products will not affect PCjr's warranty.

"The question has been, 'Why buy a PCjr instead of a [Personal Computer]?' " said Tecmar, Inc.'s President Marty Alpert. "The real question will be, 'Why buy a [Personal Computer] when you can get a [PCjr]?' "

Cleveland-based Tecmar plans to offer four basic products priced from \$145 to \$395: The Jrcaptain will add 128K bytes of RAM, a printer port and a clock/calendar to the PCjr; the Jrcadet will add 384K bytes of RAM; the Jrsecond Mate will add a printer port and clock/calendar; and the Jrwave will add memory in 256K increments until the PCjr's limit of 640K bytes of RAM is reached. Like most add-on products, the Tecmar boards will connect to the PCjr through an expansion box that plugs into the parallel port.

New companies are also getting into the act with PCjr equipment. Vendors like Legacy Technologies Ltd. of Lincoln, Neb., are taking an even more aggressive approach than Tecmar to enhancing the PCjr — of

See PCJR page 100

### Electric Desk package to address one reason for PCjr's poor sales

**BOSTON** — "There are two reasons why the [IBM] PCjr is not selling well," said Richard Rabins, president at Alpha Software Corp. in Burlington, Mass.

"The first reason is the keyboard. The second is the lack of a software product that really makes it sing. The [Apple Computer, Inc.] Apple II had [Visicorp.'s] Visicalc. The IBM Personal Computer had [Lotus Development Corp.'s] 1-2-3. The PCjr hasn't had a product like that."

Hoping to make the PCjr at least hum a few bars, Alpha has introduced Electric Desk, an integrated word processing, spreadsheet, data base management and communications package that runs on a PCjr with 128K bytes of random-access memory (RAM) and one disk drive. It runs on the IBM Personal Computer with 256K bytes of RAM.

Electric Desk's spreadsheet reportedly features 255 rows by 255 columns. Its data base manager stores 65,000 records with 50 characters and 1,000 fields per record, and the word processing application features on-screen ruler with user-selected margins and tabs.

The communications application will automatically dial telephone

numbers stored in a data base Rolodex file, according to Alpha.

The integrated program reportedly has a multitasking capability that allows a user to suspend an operation and then return to it after using another application.

The program supports windows and allows users to define and store macros. Each screen lists function key definitions and includes context-sensitive Help screens, according to Alpha.

"The only way PCjr will survive is as a personal productivity tool," Rabins said, and Alpha has targeted its productivity software toward corporate middle managers.

"There are still a number of managers who do not use personal computers," Rabins said. "Packages for these managers have to be extremely easy to use. It takes three days for dealers to learn Lotus' Symphony; we train these dealers in four hours," he added.

Electric Desk for the IBM PCjr costs \$295; an IBM Personal Computer version sells for \$325.

More information on Electric Desk is available from Alpha Software, which is located at 30 B St., Burlington, Mass. 01803.

*Bartimo is a senior writer with Infoworld, a weekly magazine devoted to microcomputer users, where this article originally appeared.*



## MICROCOMPUTERS

## DEC targets vertical OEMs with A-to-Z integrated tool

BOSTON — Hoping to attract vertical market OEMs, Digital Equipment Corp. has announced A-to-Z, an open-architecture integrated package that runs on DEC's multiuser Micro/PDP-11.

Priced at \$1,200, A-to-Z includes menu and system management extensions to the Micro/RSX operating system; word processing, data base management and graphics software; and a tool kit that provides software routines for creating applications, DEC said.

"The key features of A-to-Z are its open architecture and the ability to integrate applications with each other," said James Willis, commercial OEM group manager at DEC.

The word processing package reportedly mirrors software used on the vendor's Decmate II. The data base management and graphics applications are subsets of packages that run on DEC's PDP-11 series minicom-

puters, according to the vendor.

Compushare, Inc.'s general accounting system and Access Technology, Inc.'s Supercomp 20 spreadsheet are the first two programs that run with A-to-Z.

Operation of A-to-Z requires a Micro/PDP-11 with 512K bytes of random-access memory, a Winchester hard disk, a dual 5¼-in. floppy disk and a terminal. The company claimed to be currently shipping the product and expected volume shipments to begin next month.

DEC is located in Maynard, Mass. 01754.

## BPS unveils graphics package

CAMBRIDGE, Mass. — Business & Professional Software, Inc. (BPS) has announced Overhead Express, a graphics package that produces overhead transparencies and foils and works on an IBM Personal Computer or Personal Computer XT using IBM's PC-DOS operating system.

The software includes four typefaces in five point sizes: modern, script, popular and classic. It offers arrow, star, legal, bracket and check mark symbols, BPS said. The product features 12 templates, including a title page, a bulleted list, a comparison chart, a table and a budget, according to the vendor.

Overhead Express accepts word

processing input. "Our research indicates that more than 70% of all presentations are text only," David Solomon, president of BPS, said.

The program requires 192K bytes of random-access memory and resides on two disks, one for the program and the second for fonts. A color graphics card is not required, but is recommended. Eleven printers are supported including Epson America, Inc.'s FX and MX printer line, Hewlett-Packard Co.'s Ink Jet printer and the IBM graphics printer.

Overhead Express costs \$195 and will be available in June.

BPS is located at 143 Binney St., Cambridge, Mass. 02142.

## Lotus 1-2-3 out for Ngen

SANTA CLARA, Calif. — Convergent Technologies, Inc. has announced that a version of Lotus Development Corp.'s 1-2-3 runs on Convergent's Ngen workstations.

"This is the fastest implementation of 1-2-3 we've developed," said Jim Kinlan, manager of OEM relations at Lotus. "It outperforms the IBM [Personal Computer] by a factor of three to one." Lotus also plans to release a Convergent-compatible version of the Symphony product in the fourth quarter.

The product works with Convergent's multiuser, multitasking Ctos operating system, which is capable of concurrently running Digital Research, Inc.'s CP/M 86 and Microsoft, Inc.'s MS-DOS operating systems.

The software will be shipped to Convergent's OEMs in July.

Convergent Technologies is located at 3055 Patrick Henry Drive, Santa Clara, Calif. 95050.

## Expansion box fits Tele-PC

SUNNYVALE, Calif. — Televideo Systems, Inc. has announced 1605E, a six-slot expansion box designed for its Tele-PC line of IBM Personal Computer-compatible computers.

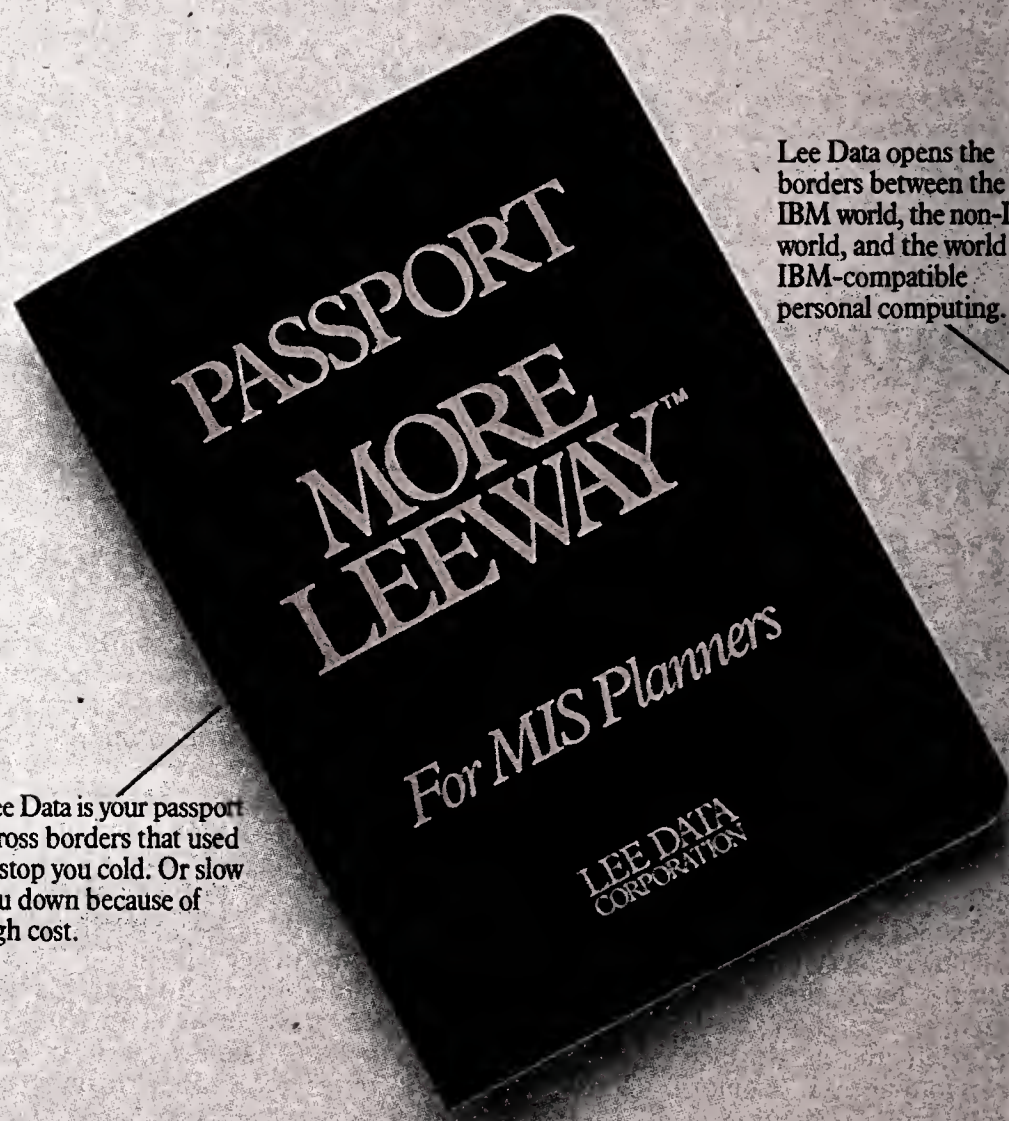
The box reportedly has an internal power supply that allows it to use expansion boards with unusual power requirements.

The vendor claims that the box works with an Ethernet network interface card from 3Com Corp., a clock-calendar card from Quadram Corp. and a Hayes Microcomputer, Inc. 1,200 bit/sec modem card.

The product costs \$349.

Televideo Systems is located at 1170 Morse Ave., Sunnyvale, Calif. 94086.

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## MICROCOMPUTERS

## Oz integrates data analysis, graphics, reporting on IBM micro

ELMWOOD PARK, N.J. — Fox and Geller, Inc. is now shipping Oz: Management Control, a software package designed to integrate financial data analysis, graphics and reporting capabilities on the IBM Personal Computer.

The program reportedly displays, makes graphs of and interprets budget variations. "Oz has a built-in variance analysis system that can pinpoint and explain budget variances," said Jeffrey Fox, Fox & Geller's president.

Oz: Management Control, which has been enhanced since its an-

nouncement last fall, allows users to create presentation-quality reports and graphs quickly, the vendor said.

The product consolidates organizational chart data, analyzes financial performance in four views, explodes and combines line items, shows quarterly data by the touch of a key, maintains yearly forecasts and defines a library of 256 graphs or reports, Fox said. The program also performs currency conversions.

The software costs \$495.

Fox and Geller is located at 604 Market St., Elmwood Park, N.J. 07407.

### BOARD-LEVEL DEVICES

#### METRABYTE CORP.

Dash-8; IE-488

Metrabyte Corp. has announced two programs: Dash-8, a high-speed data acquisition interface board for IBM Personal Computer XTs and compatible computers; and the IE-488 general interface I/O expansion board for IBM Personal Computers.

Dash-8 acquires data at 4,000 sample/sec and has eight single-end analog input channels. Software is included and contains graphics, board calibration, linearization, a CRT-assisted setup procedure and an I/O driver, a company spokesman said.

Other features include program-mable scan rate, foreground/back-

ground operation, 7 bits of digital I/O, interrupt handling and frequency counting to 2.5 MHz. The price for Dash-8 is \$375.

The Model IE-488 was designed to plug directly into one IBM Personal Computer I/O slot. The product has a built-in 12K-byte read-only memory command interpreter, which handles the initialization and protocol functions required to use the IEEE 488 interface. The price is \$395.

Metrabyte, 254 Tosca Drive, Stoughton, Mass. 02072.

#### IEV CORP.

IBM Personal Computer color graphics board

IEV Corp. has introduced a high-resolution color graphics board for the IBM Personal Computer that reportedly replaces the IBM color adapter card.

The color graphics board allows users to run current programs and to create new software using the board's features, according to a company spokesman.

Among the board's applications are business graphics, animation, videodisk and videotape production, overlaying of graphics on video pictures and computer-aided instruction, according to the IEV spokesman.

The board is said to have its own 32-bit processor and to produce resolution of 640 by 400 lines with 16 colors.

In addition, it includes on-board primitives to draw circles, rectangles, ellipses and arcs, the spokesman said.

The IEV high-resolution color graphics board for the Personal Computer is priced at \$800, the vendor said.

IEV, Suite 280, 254 W. Fourth St., Salt Lake City, Utah 84101.

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(Formerly RHB Computers)
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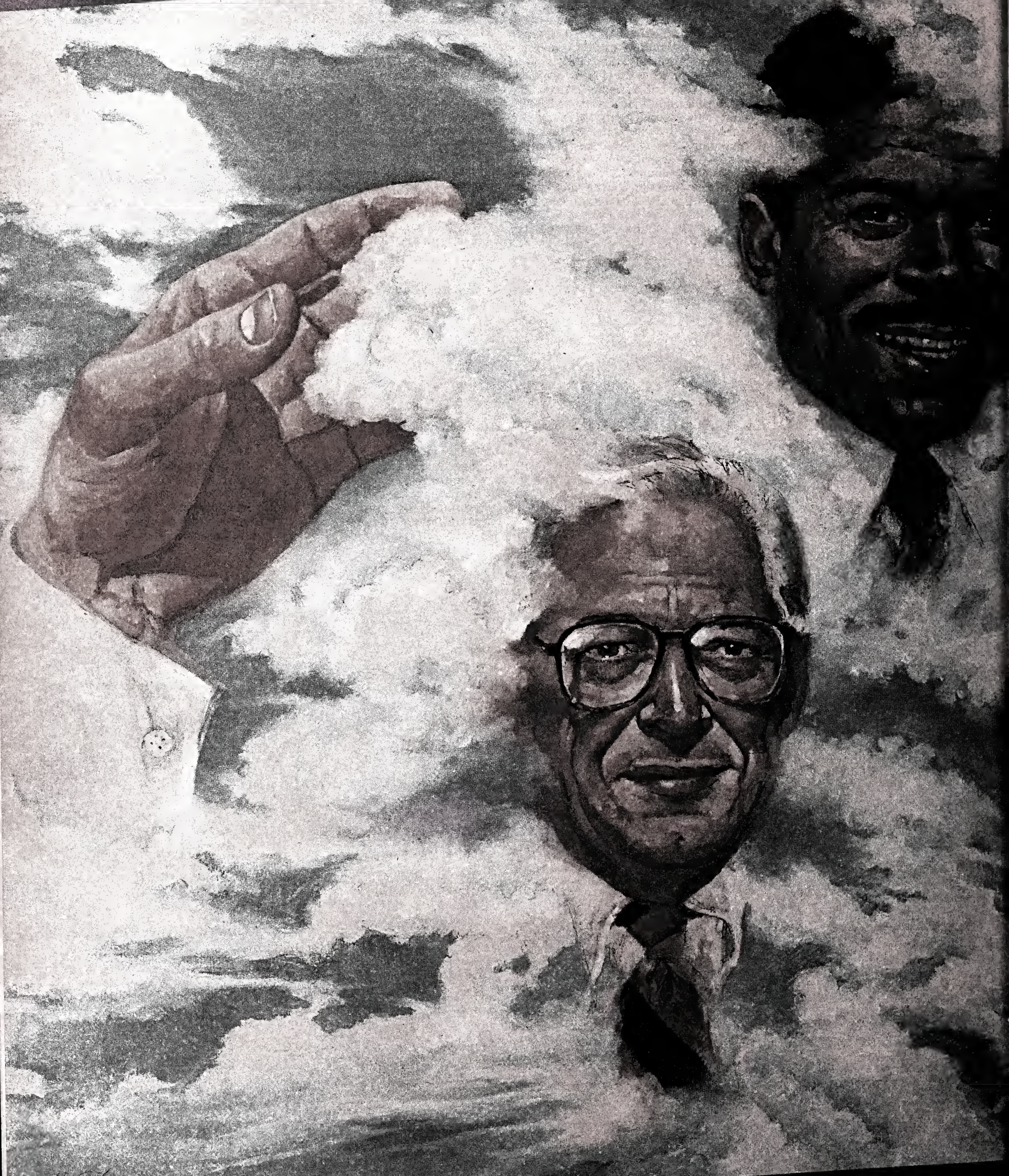
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## MICROCOMPUTERS

## AUXILIARY EQUIPMENT

**HESLEY CORP.**  
**MDC-350; AIC-525; ADC-525**

Hesley Corp. has introduced three products: a four-slot manual diskette certifier for 5¼-in. and smaller diskettes; an automatic diskette certifier; and an automatic diskette copier, both for 5¼-in. diskettes.

The manual certifier, the MDC-350, reportedly features user-selectability for the type of diskette drive and can detect defects in high-density diskettes in the range of 10,000 bit/in. Users can define the thresholds for missing pulse errors and extra pulse errors in diskettes with different formats, recording densities and number of sides, Hesley said.

The automatic diskette certifier, the AIC-525, reportedly allows users to set certification criteria to their own standards and permits track-to-track or total surface testing on diskettes containing 48 to 192 track/per in.

The automatic diskette copier, the ADC-525, operates unattended to duplicate, format, verify and security-encode diskettes, according to the vendor. The copier is said to be able to load and unload a diskette from its drive in less than three seconds.

The ADC-525 is priced at \$7,495, the AIC-525 at \$17,000 and the MDC-350 at \$40,000.

*Hesley, 1032 W. Hedding St., San Jose, Calif. 95126.*

**REMOTE SYSTEMS, INC.**  
**Secureware Jr.**

Remote Systems, Inc. has introduced a miniaturized version of its Secureware device for software protection.

Called Secureware Jr., the device reportedly was designed to protect an individual program and operate as a hardware key needed to run the secured program. Secureware Jr. operates via the serial or parallel communications port of a microcomputer without interfering with attached peripherals, Remote Systems said. It also reportedly permits backup copies of a secured program to be produced and provides encryption of communications protocols.

Secureware Jr. also reportedly can be programmed to provide validation of users requesting access to a computer system or to networks of microcomputers.

Secureware Jr. operates on the IBM Personal Computer, the Texas Instruments, Inc. TI Professional and on other personal computers with an RS-232 board. It is priced at \$115.

*Remote Systems, 7655 Old Springhouse Road, McLean, Va. 22102.*

**PRONTO COMPUTERS, INC.**  
**Series 16**

Pronto Computers, Inc. has announced a line of 5¼-in. disk drive options to provide up to 113.4M bytes of hard disk storage for its Pronto Series 16 supermicrocomputers.

The enhancement is said to include an enclosure for one or two drives, a drive controller, a host adapter

and subsystem software. Available drives include 23M-byte, dual 23M-byte, 34.5M-byte, dual 34.5M-byte, 56.7M-byte and dual 56.7M-byte.

The 23M-byte and 34.5M-byte drives reportedly can be installed inside the Series 16/110 as a factory option in the system.

Prices for the drive options range from \$2,400 to \$9,500, depending on the size and combination of desired

drives, the vendor said.

*Pronto, 3730 Skypark Drive, Torrance, Calif. 90505.*

**CONSOLINK CORP.**  
**Consocard; Sooperspooler; Microspooler**

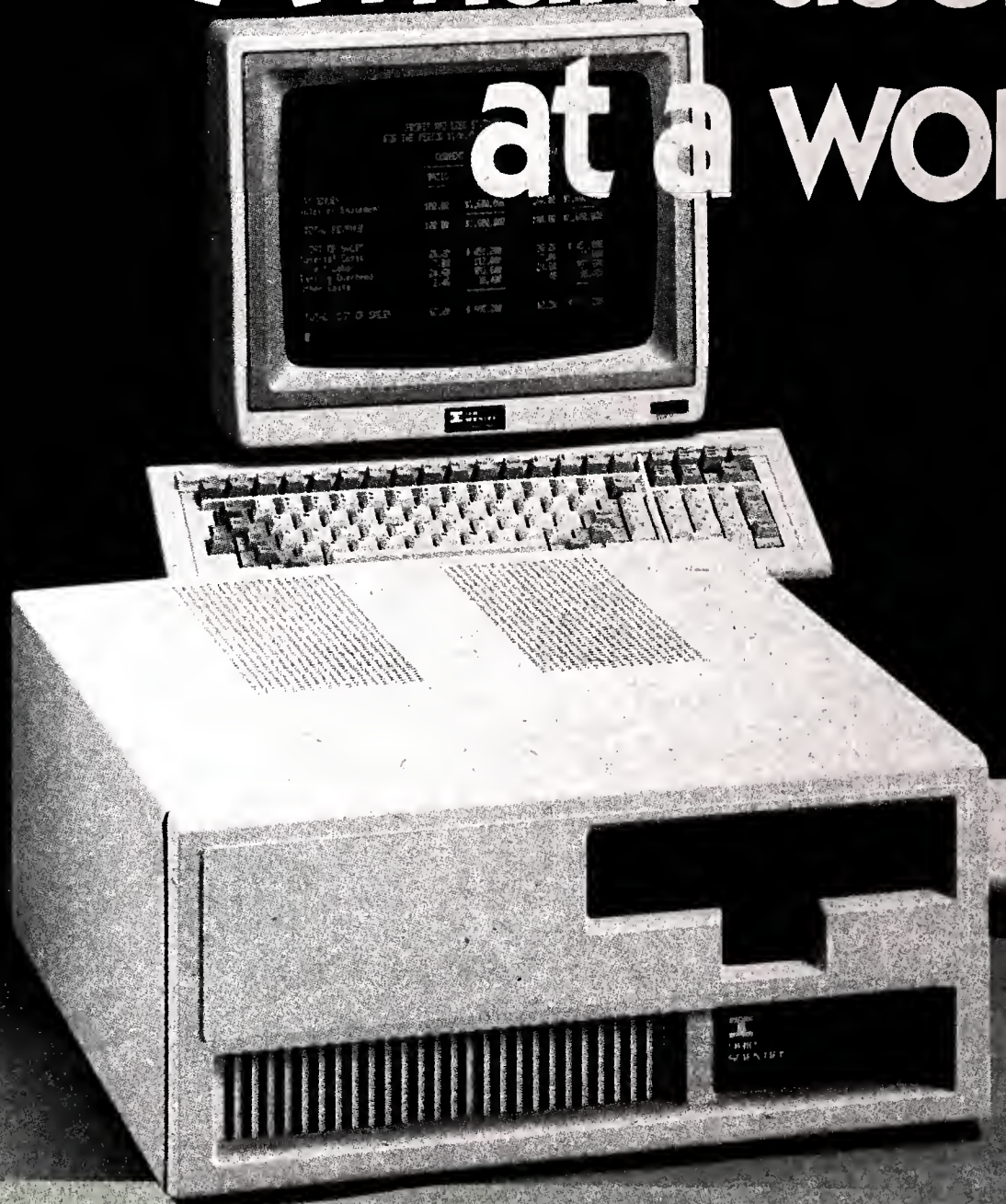
Consolink Corp. has announced a multifunction expansion board for the IBM Personal Computer and Personal Computer XT microcomputers and spooler buff-

er/interfaces for most micros. The Consocard add-in board is said to feature up to 384K bytes of memory, while using only one expansion slot. It includes two asynchronous RS-232 I/O ports that are said to allow additional I/O devices to be connected without switch cables for tasks requiring various serial I/O devices.

Prices range from \$395 for the 64K-byte version to \$895 for the 384K-byte version.

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## MICROCOMPUTERS

The Sooperspooler buffer/interface is designed to work with all types of microcomputers and eliminate downtime caused by printer delays. In addition to storing information in the buffer prior to printing, it can be used as a separate data collection device, accepting data from devices such as telephone modems and remote terminals and feeding data directly to the computer.

It features a Zilog, Inc. Z80

microprocessor, which allows for interfacing with otherwise incompatible systems, according to the vendor. It also is said to feature a pause button to halt printer output temporarily, page formatting, single-sheet feeding, space compression, page heading, two reset buttons and a buffer status read-out.

Equipped with 16K bytes of memory and one parallel input and one parallel output

port, it costs \$349. A 62K-byte memory expansion option costs \$159, and a serial option is priced at \$95.

The Microspooler buffer/interface offers features similar to the Sooperspooler, as well as a multiple copy function.

It is available in serial and parallel configurations for \$199.

Consolink, 1275 Sherman Drive, Longmont, Colo. 80501.

## SOFTWARE

### MICRODATA CORP. All Distribution Management System

Microdata Corp. has introduced a warehouse operations software package called the All Distribution Management System for use on the Microdata 4700, 7000 and 9000 computer systems. The new package includes

four modules.

The Purchase Order Processing module reportedly allows users to maintain purchase order records by company and warehouse and features multiple warehouse order processing. It reportedly includes file, open purchase order and closed purchase order listings.

The Inventory Control module reportedly provides a perpetual inventory by company and warehouse and is said to interface to general ledger/order processing and purchase order processing applications. Average cost, replacement cost and standard cost inventory costing methods are available.

The Order Entry/Invoice Processing module provides validating and editing techniques to assure data accuracy, the vendor said.

The Sales Analysis application, a subsystem of the Order Entry module, provides data files used in sales analysis. The module also features multiple-analysis reports and the ability to analyze current, previous or year-to-year variances.

The All Distribution Management System package is available for \$4,600. Modules in the package are priced individually at \$1,000 for Purchase Order Processing, \$1,500 for Inventory Control, \$1,500 for Order Entry/Invoice Processing and \$600 for Sales Analysis, according to the vendor.

Microdata, 17481 Red Hill Ave., Irvine, Calif. 92714.

### HUMAN COMPUTING RESOURCES CORP. Distribution Management for Inventory and Sales Analysis

Human Computing Resources Corp. has announced the addition of a software module, called Distribution Management for Inventory and Sales Analysis, to the Chronicle family of accounting software modules.

Continued on page 92

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## MICROCOMPUTERS

Continued from page 91

Distribution Management includes inventory, invoicing, sales and profitability analysis, sales order purchasing and purchase order processing features, according to a spokesman from Human Computing.

The package joins the basic Chronicle Accounting modules of accounts payable, accounts receivable and general ledger. Chronicle works on most machines running

AT&T's Unix operating system, the vendor said.

The price for the Distribution Management software for inventory, invoicing and sales and profitability analysis is \$5,000.

The cost to add sales order processing and purchase order processing is \$1,000 for each feature, according to the vendor.

*Human Computing Resources, 10 St. Mary St., Toronto, Ont.*

#### COMSHARE, INC. Plannercalc

Comshare, Inc. is offering a new version of the company's Plannercalc spreadsheet for the IBM Personal Computer, PCjr, Personal Computer XT and Portable Personal Computer.

Plannercalc reportedly includes demonstration spreadsheets covering subjects such as home budgets, car or home purchases and taxes. The

program features an on-screen display of active function keys, menu-driven print capability and context-specific help screens, Comshare said.

Plannercalc requires 128K bytes of random-access memory and Microsoft, Inc.'s MS-DOS 2.0 or 2.1 operating systems.

Plannercalc is priced at \$79.95.

*Comshare, 3001 S. State St., Ann Arbor, Mich. 48106.*

#### AWARD SOFTWARE, INC. Crosssave; PC-Care; enhanced Crossdata

Award Software, Inc. has announced three business software programs: Crosssave, PC-Care and enhanced Crossdata.

Crosssave is designed to back up large data bases from a Winchester disk to floppy disks. Crosssave offers high-speed data transfer and compresses data so that a diskette can store 10% to 20% more kilobytes of data, according to the vendor. Crosssave works on microcomputers using Digital Research, Inc.'s CP/M or Microsoft, Inc.'s MS-DOS operating systems.

PC-Care, a menu-driven test system for the IBM Personal Computer, periodically checks the performance levels of floppy disk drives, validates sectors on Winchester disks, certifies main memory and provides printer and keyboard diagnostics, the vendor said.

Crossdata reportedly converts data between microcomputers using different operating systems or disk formats. Crossdata is available for 25 popular types of personal computers, according to Award Software. The program can initialize a blank diskette and offers an expansion function that allows the user to add disk formats not included on the menu, the vendor said.

Each program costs \$99.

*Award Software, 236 N. Santa Cruz Ave., Los Gatos, Calif. 95030.*

#### NELSON DATA RESOURCES, INC. Lazycoder-Screen II

Nelson Data Resources, Inc. has announced the Lazycoder-Screen II for the IBM Personal Computer and Personal Computer XT.

The product reportedly creates and edits full screens and can generate three types of file maintenance programs. It supports hard disks or floppy diskettes with IBM's PC-DOS 2.0 or later versions.

The package creates an "electronic blackboard" which displays text, prompts, messages, special characters, borders/boxes and input fields, in color or monochrome, according to a company spokesman.

Additional capabilities reportedly include input fields that handle 12 format types including date, social security number, uppercase, yes-no, telephone numbers and length check. Programs generated can access up to 300 fields per screen with multiple screen support via simple code modification, according to Nelson. The price is \$295.

*Nelson Data Resources, P.O. Box 24247, Omaha, Neb. 68124.*

See **TOOLS** page 94

## Dear Ma:

# Scotsman multiplexers are the way to go with AT&T falling behind on line installations.

Ma Bell,  
% Heaven

#### There's Good News and Bad News

The good news is that Racal-Vadic's fine Scotsman multiplexers (45 versions to choose from) are available for immediate delivery.

The bad news is that, according to *USA Today*, AT&T is filling only 25% of its private line orders on time, has doubled the waiting time to 10 weeks, and is taking 50% longer to repair private lines than in 1983. They miss you, Ma.

#### Install Scotsman and Reduce Line Costs

How can data network users avoid these delays? Easy. Reduce the number of private lines by installing Scotsman multiplexers. Scotsman I is a high-quality, low-cost 4- or 8-channel stat mux with optional built-in 2400 or 4800 bps modem. Scotsman II is even more sophisticated, providing system control and monitoring. One customer saw his line costs drop from over \$1,000 to \$58 a month merely by adding a pair of Scotsman. They paid for themselves in a few months.

#### Data Compressor Further Cuts Line Costs

Racal-Vadic's new data compressor sends a 19.2 kbit data stream over a single voice-grade line using 9600 bps modems. Or data from 4 bisync or 2 full-duplex 9600 channels can be transmitted over one telephone line. This can add up to great savings for users.

#### Now, Free Installation

No one has to wait for AT&T — or deal with multiple vendors — because Racal-Vadic can supply the whole system, including multiplexers, modems, data compressors — and accessories.

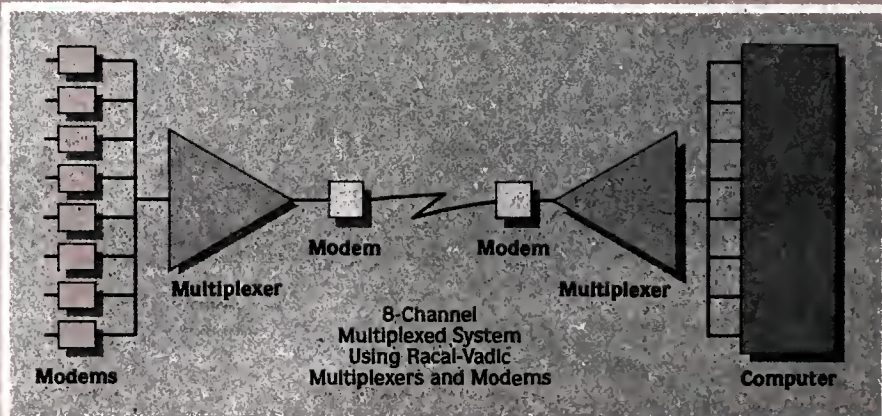
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## MICROCOMPUTERS

## TOOLS from page 92

QINT DATABASE  
SYSTEMS CORP.  
Qint/Sol

Qint Database Systems Corp. has announced Qint/Sol, a microcomputer data base management package which is said to be compatible with IBM's mainframe relational data base management system SQL/DS and Database 2.

Qint/Sol has three tiers: Query, for users who only need to retrieve data from a data base; Query and Update, for users who need to enter and retrieve data; and Administrator, for DP professionals who create, maintain and manage data base systems, according to a spokesman for Qint.

Qint/Sol can be used on microcomputers with a minimum of 640K bytes of random-access memory, operating with an Intel Corp. 8086 or 8088 CPU, or Motorola, Inc. 68000 CPU, the vendor said.

The program works under Digital Research, Inc.'s CP/M and MP/M, Microsoft Inc.'s MS-DOS, and IBM's PC-DOS operating systems, according to the vendor.

The price for Qint/Sol ranges from \$1,000 for the Query element to \$9,000 for the multiuser version of the Administrator element, the vendor said.

Qint Database Systems, 50 Waban Hill Road N., Chestnut Hill, Mass. 02167.

THE SMALL COMPUTER  
CO., INC.  
Filepro 16

The Small Computer Co., Inc. has announced a data base management package for the IBM Personal Computer XT, Radio Shack's Model 2000 and other Microsoft, Inc. MS-DOS-based microcomputers.

Filepro 16 reportedly enables first-time users to set up an electronic filing system. The user defines fields, such as name, address or invoice number, and the program will automatically arrange the fields on the screen or report, a vendor spokesman said.

The menu-driven program's relational capabilities permit data to be transferred automatically between files, allowing the posting operations needed for a bookkeeping function, the spokesman said.

Filepro maintains up to 16 million records per file, 999 fields per record and up to 4,608 characters in each record. It allows information to be transferred to Microsoft's Multiplan spreadsheet program and Micropro International Corp.'s Wordstar word processing program, the vendor said.

Minimum hardware requirements are any MS-DOS-based computer with at least 256K-bytes of random-access memory and a hard disk drive.

It is also available for the Radio Shack 2000 on floppy disks.

The program costs \$495.  
The Small Computer Co.,  
Suite 1200, 230 W. 41st St.,  
New York, N.Y. 10036.

GEOCOMP LTD.  
Easydij

Geocomp Ltd. has announced a program that reportedly permits the conversion of data from digitizer tablets to Lotus Development Corp.'s 1-2-3 files with IBM Personal Computers or other IBM-compatible machines.

Easydij is menu-driven and runs on systems using IBM's PC-DOS or Microsoft, Inc.'s MS-DOS operating systems, with a minimum requirement of 128K bytes of storage and one 5¼ in. floppy disk drive.

With Easydij, a map or diagram can be placed on a digitizing tablet surface in any orientation. The program will automatically correct differences in orientation and scale. The digitized data then can be written to a disk file or printer, a vendor spokesman said.

Easydij reportedly will operate as a planimeter, measuring areas, perimeters, volumes or volume weights, the spokesman said.

It is priced at \$160.  
Geocomp, 749 Van Gordon  
Court, Golden, Colo. 80401.

SHEPPARD SOFTWARE  
CO.  
Micropert 0 Project  
Management System  
Version 3

Sheppard Software Co.

has announced a revised version of its Micropert 0 Project Management System for the IBM Personal Computer and the Personal Computer XT, Compaq Computer Corp. portable computers and the Panasonic Industrial Co. Senior Partner.

Version 3 features a rewritten users manual, an on-line Help facility, the ability to schedule 220 activities in 20 seconds, time-scaled network diagrams, Gantt bar charts, multidirectional scrolling and the ability to print sideways on IBM and Epson America, Inc. printers.

It is said to require 192K bytes of memory, Microsoft, Inc.'s MS-DOS 1.1, 2.0 or 2.1, a double-sided disk drive, 80-col. by 25-line display, and IBM, Epson (MX or FX) or compatible printer.

It costs \$350.  
Sheppard Software, 4750  
Clough Creek Road, Redding,  
Calif. 96002.

PHILLIP RANKIN &  
ASSOCIATES, INC.  
Screen-G/H

Phillip Rankin & Associates, Inc. has announced that Screen-G/H, a block-mode screen management system for microcomputers, is now available for Microsoft, Inc.'s MS-DOS and Unix operating system.

Designed for the applications developer, Screen-G/H is used in the development of RM/Cobol-based applications. The package has two modules: Screen-Generator, which is said to enable the

developer to define screens for end users; and Screen-Handler, which is said to act as a data transfer interface between the end user and the applications program.

The software is said to reduce source code by as much as 50% when developing Cobol applications and is said to aid developers with mainframe-to-micro conversion of on-line real-time systems. Screen-G/H had run under Phase One Systems, Inc.'s Oasis operating language prior to the new development.

The price is \$995 for the MS-DOS version and \$1,495 for the Unix version.

Phillip Rankin & Associates, P.O. Box 290, Grandview, Mo. 64030

DATA PROCESSING  
DESIGN, INC.  
Word-11

Data Processing Design, Inc. has announced an enhanced version of its word processing package for Digital Equipment Corp.'s Professional 350 microcomputer.

Word-11 enhancements reportedly include list processing and spelling error detection. Other Word-11 features include journaling; military style paragraph numbering; automated table of contents and footnoting capabilities; grammatical editing keys; bolding and underlining; global search and replace and column operations that move, insert or sum while still in the editing mode, the vendor said.

The Word-11 package is priced at \$595.

Data Processing Design,  
1400 N. Brasher, Anaheim,  
Calif. 92807.

WALKER RICHER AND  
QUINN, INC.  
PC 2622

Walker Richer and Quinn, Inc. have announced the PC 2622 data communications program for Wang Laboratories, Inc.'s Professional Computer, which uses Microsoft, Inc.'s MS-DOS operating system.

Available on the IBM Personal Computer since 1983, the PC 2622 emulates Hewlett-Packard Co.'s 2622 block-mode terminal.

All HP 3000 block- and character-mode application software runs transparently with PC 2622.

The PC 2622 permits local or remote communication at rates of 300 bit/sec to 19,200 bit/sec, the vendor said.

The Wang Professional Computer version of PC 2622 requires a Wang Professional Computer with at least 128K bytes of random-access memory and one RS-232 port, according to the vendor.

The price for a single copy of PC 2622 is \$395.

Walker Richer and Quinn,  
Suite 201, 1914 N. 34th, Seattle,  
Wash. 98103.

See TOOLS page 99

David  
Recommends The Diablo 630 Series

## David Jamison Carlyle recommends the Diablo 630 Series.

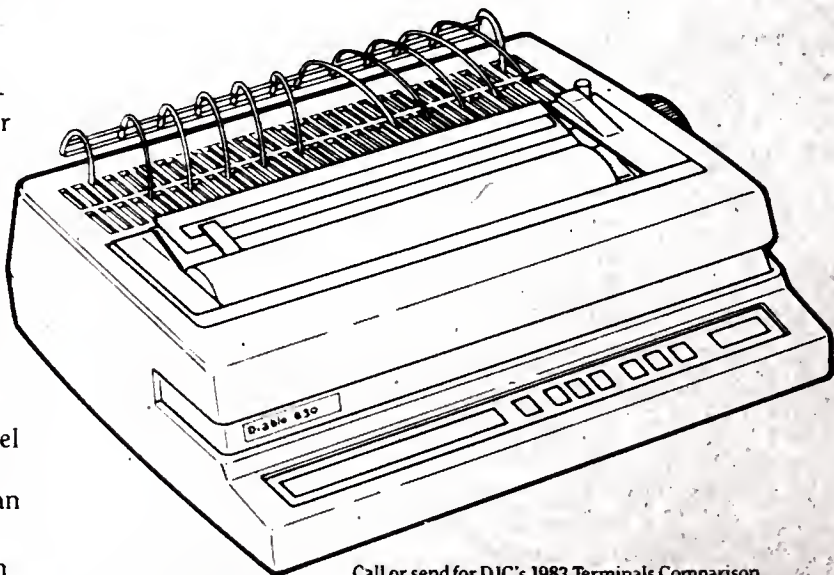
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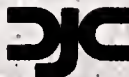
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## MICROCOMPUTERS

**BARR SYSTEMS, INC.****Barr/Hasp**

Barr Systems, Inc. has introduced a terminal emulator package that reportedly allows an IBM Personal Computer, Personal Computer XT or Personal Computer compatible to function as an IBM remote job entry terminal.

The package reportedly also permits IBM Personal Computers to receive and transmit data from mainframes to IBM's VM/RSCS. It is said to be compatible with all Hasp multi-leaving protocols and emulates the IBM 3777-2 and Hasp on an IBM 360/20.

Barr/Hasp is reportedly able to print at 1,600 line/min. when used

with a Xerox Corp. 2700 laser printer using compression and decompression of data through the communications link and supports up to seven printers concurrently.

Barr/Hasp is offered for \$890, including synchronous communications adapter board, software and a manual.

*Barr Systems, Suite 315, 2500*

*Blue Ridge Road, Raleigh, N.C. 27607.*

**SUMICOM, INC.****CAD 10**

Sumicom, Inc. has introduced a computer-aided design (CAD) package for its System 830 micro.

**Continued on page 100**

**MENU** from page 85

The menu should present simple, easy-to-understand options and access to different applications. The applications should include word processing, a spreadsheet program, a data management system, a communications program, a notebook program, a time management system and disk management.

**Helpful options**

An option that allows the user to return to DOS is almost mandatory, and a second option — access to a language processor such as Basic — could be helpful. In addition, the workstation menu may offer routes to two additional submenus: one for word processing systems and another for disk management.

Depending on individual needs, it may be necessary to provide more than one word processing system. While there are a number of powerful word processing packages on the market, no single system contains all the bells and whistles a user might need.

I routinely use several text editors, including Wordstar, Vedit and Pmate. I use Wordstar and a homegrown system (a text output processor) for text formatting. For example, if I want to send a neatly formatted message over the electronic mail system, I first edit it with the above-named editors.

The homegrown formatter then places the formatted Ascii text on a diskette. Because the formatter embeds formatting controls and control characters in text files, Wordstar, as well as other word processing systems, are unsuited to format the diskette.

**Removing characters**

The embedded characters have to be removed because a communications program is then executed, and the file is uploaded directly into the mail system. Wordstar and other systems using embedded control codes will often create havoc with communications systems.

The homegrown formatter will also produce formatted comment statements for both Basic and Fortran, as well as files of PRINT or DATA statements for Basic programs, thus allowing neat internal documentation for programmers.

Wordstar and other systems produce print image disk files, but they often include all of the control characters necessary to control the printer rather than the image that appears on paper.

One very useful utility is a copy program for Wordstar-type files that will eliminate control characters and reset the parity bits of various characters to zero.

Multiple options are also useful for disk management. For a complete workstation, the user should be able to manage a disk without exiting to DOS.

The user should also be able to

look at a directory of any on-line disk, kill files, rename files or perform other file management functions.

While the applications programs in the system are generally available as off-the-shelf items, the other system features are not yet available as stand-alone programs, but are included in some integrated programs.

There are other software packages that an individual user might find helpful or necessary. A financial planner might find less emphasis desirable on one facet of the system (word processing, for example), while placing more emphasis on analytical and statistical systems. Consequently, instead of showing one box for analysis, we might have shown

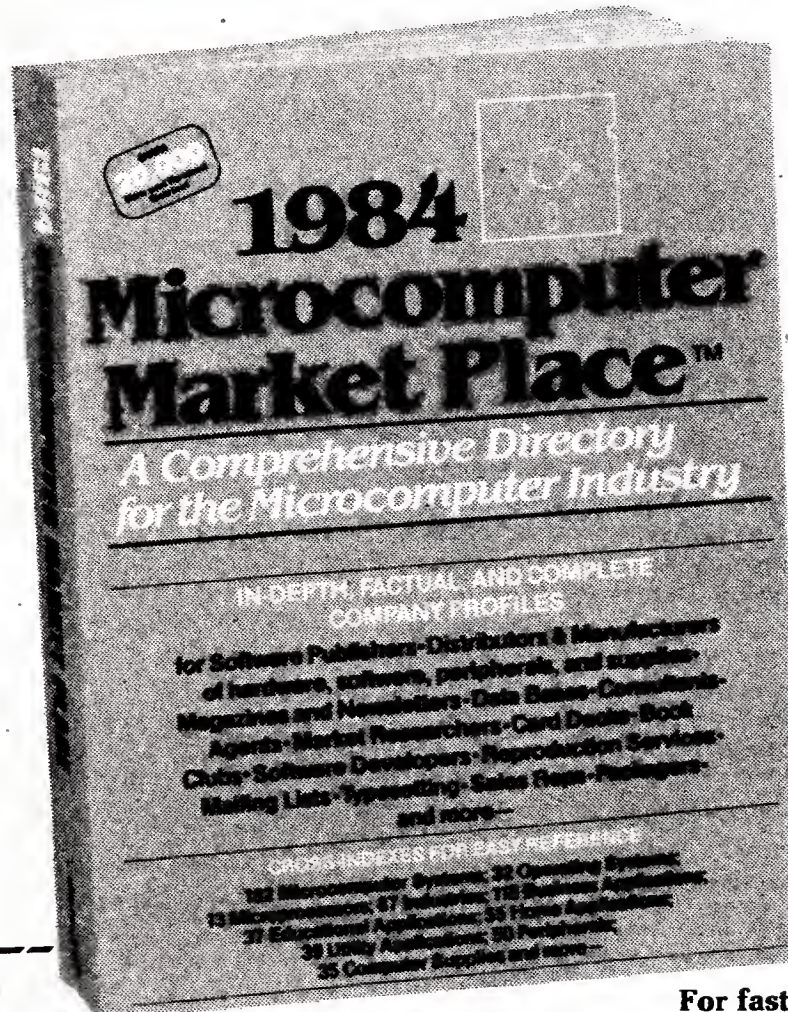
another submenu that included a spreadsheet program along with frequently used analytical or statistical programs.

How elaborate the system becomes is a function of the disk space available. A useful workstation can be structured with floppy disk drives, but a useful system would require a Winchester disk.

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## MICROCOMPUTERS

Continued from page 99

The CAD 10 program is said to be designed specifically for architects, interior designers and space planners, landscape designers, mechanical engineers and others using diagrams and schematics.

CAD 10 reportedly enables the user to draw symbols and transcribe them into scaled drawings. It costs \$595.

Sumicom, 17862 E. 17th St., Tustin, Calif. 92680.

## COMMUNICATIONS

INFORMATICS GENERAL CORP.  
PC/Net-Link

Informatics General Corp. has an-

nounced PC/Net-Link, a utility program for accessing and searching remote data bases.

The utility reportedly can search data bases of manufacturers such as Dialog Information Services, Inc. and BRS Computing, Inc.

PC/Net-Link features menu-driven selection of data bases by subject or name, Help screens, automatic connection, disconnection, logon and logoff, according to a vendor spokesman.

The utility requires a hard disk, a printer, and Hayes Microcomputer Products, Inc. Smartmodem 1200 or Genesys Software Systems, Inc. or Telios communications package.

PC/Net-Link is priced at \$550.

Informatics General, 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

## PCjr from page 85

fering memory, a second disk drive and a hard disk. Legacy's products come in myriad combinations and are contained in an expansion unit that sits on top of the PCjr.

Legacy President Steve Jacob pointed out that an enhanced PCjr potentially offers more features than an IBM Personal Computer, since the PCjr accepts read-only memory (ROM) cartridges, and "the video graphics are about eight times more powerful."

The Legacy I base system, which costs \$395, is an expansion cabinet with four slots, an LED status display panel and cabling to the PCjr I/O bus. The \$795 Legacy II adds a half-height disk drive to the base system. Legacy III, the only product not yet

available, includes the base system, a hard disk controller and a 10M-byte hard disk drive for \$1,595.

To fill the slots in the expansion cabinet, Legacy offers the EXP, which adds memory, and the CPS, which adds a clock/calendar plus parallel and serial ports. Also available is a disk controller card to add a disk drive to the basic PCjr.

Jacob suggested that potential PCjr buyers purchase the lower priced basic PCjr because buying disk drives later from independent manufacturers will be less expensive than purchasing the enhanced PCjr system. Even if the buyer already owns the advanced PCjr, he can still save a substantial amount of money.

For instance, one extra drive and more memory for the advanced PCjr saves \$1,000 over the cost of the IBM Personal Computer. And adding a hard disk allows for a \$3,000 savings over the cost of the IBM Personal Computer XT, according to Jacob.

## Extender modules

Falcon Technology, Inc. in Kent, Wash., is planning next month to ship its PCjr extender add-on module, which offers a second disk drive and expansion slots for an addition of as much as 256K bytes of RAM. Included with the \$995 unit is a general-purpose expansion slot and an enhanced version of Microsoft, Inc.'s MS-DOS 2.1.

In addition to offering a floppy disk controller, Falcon offers a clock/calendar/mouse port card and the Microsoft mouse as options.

"We figure that with our system, you already save \$600 over the Personal Computer — \$250 of which you can put toward a new keyboard," said Tim Patterson, Falcon president.

Other third-party manufacturers are readying a plethora of digital mice aimed at business users: Mouse System's mouse has always run on the PCjr since it requires only the serial port for connection. "All you need is an adapter cable, available from IBM, to use [Mouse System's] mouse," said Eileen Millian of the Santa Clara, Calif., firm.

Buyers adding an expansion unit almost certainly will replace IBM's Chicklet-size keyboard with a full-stroke model. Keyboard makers, such as Key Tronic Corp. of Spokane, Wash., are anticipating healthy profits from selling replacement keyboards.

"Corporate accounts have more leverage with IBM, and a lot of them are ordering the [PCjr] without the keyboard," said Key Tronic Marketing Manager Joe Dooley. Key Tronic is selling two replacement keyboards: the KB-5151jr, a 99-key model, priced at \$255; and the KB-5150jr, an 83-key version, for \$209.

Although hardware improvements may seem like the ideal solution to the PCjr's handicaps, some problems remain. Most manufacturers of these additional products point out that the PCjr's processor and disk drives are slower than the IBM Personal Computer's, although adding memory and using some of it as an electronic disk minimizes the problem.

Perhaps the most obvious drawback is that the expansion units cannot accept boards manufactured for the IBM Personal Computer because the PCjr has a smaller chassis and a different number of connector pins. So all boards for the PCjr must be designed for that machine.

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# COMPUTER INDUSTRY



**INDUSTRY INSIGHT**  
Peter Bartolik  
CW Senior Editor

## Lotus poised for advertising blitz

**L**otus Development Corp. is ready to raise the ante on the micro software poker table, announcing recently it will launch a multimillion dollar national advertising campaign this summer, including sponsorship of ABC TV's coverage of the Summer Olympic Games.

Micro software vendors who have been bankrolling dozens of micro publications are likely to face the unenviable situation of putting up or shutting up when Lotus broadens the market arena beyond the dedicated professional and hobbyist.

Lotus TV ads will begin in late June with ABC's coverage of the U.S. Olympic trials, continue through the Olympics into August and show up again in September during national coverage of the U.S. Tennis Open.

That can only mean it is just a matter of time before we see videos of Santa sliding down the chimney to plunk down a copy of Symphony in front of dad's IBM Personal Computer.

It also means that other software publishers are likely to follow the lead and start pouring megabucks over the airwaves in an attempt to capture a big enough share of the personal computer-owner market to keep Wall Street analysts happy.

Whether that means that the dozens of micro journals are going to see their revenues decline — the long-expected publishing shakeout — as advertising dollars are diverted remains to be seen. Given the figures of how many micros are going to be sold in the next few years, and the eventual development of the home computer market, there may be enough money to go around to keep everybody happy.

See **COLUMN** page 121

## Trade groups enter tax dispute Side with Calif. supplier on software exemption

By **Jeffrey Beeler**  
CW West Coast Bureau

Two trade associations have joined a long-standing legal dispute over whether a Silicon Valley software supplier is obligated by law to pay the state of California thousands of dollars in back sales taxes.

In Washington, D.C., the Association of Data Processing Service Organizations, Inc. (Adapso) has already filed court papers supporting General Business Systems, Inc. in its four-year legal battle with California's State Board of Equalization.

On the West Coast, meanwhile, another set of such documents, similar in content to Adapso's, are reportedly being readied by the Software Services Association (SSA). The SSA papers are unlikely to be filed in court for at least nine months, according to the organization's president, Brooks Griffin.

Both industry groups hope to persuade the California Court of Appeals to uphold a lower court ruling that decided the taxation case in favor of the software vendor.

The appellate court's decision will affect scores of California programming firms, many of which could face massive back-tax assessments if the Board of Equalization's viewpoint ultimately prevails, according to Adapso spokesman David Sturtevant.

"Many companies, especially small ones, could have a couple of years' worth of profit margins entirely wiped out if their back taxes go back far enough and have to be paid all in one shot," he said.

At issue in the case is the board's contention that General Business Systems owes \$50,000 in state sales taxes for custom programs the firm sold between 1972 and 1976. But even after years of courtroom and other legal bickering, the validity of the board's claim is still open to serious question, according to participants.

"This case involves a legitimate legal dispute," according to Gary Jugum, the board's assistant chief counsel. "It's not crystal clear that one side is absolutely

See **TAX** page 121

## PRIME

Computervision Corp. may have Big Blue on its team, but Prime Computer, Inc. believes a top-to-bottom line of fully compatible machines is the key to success in the CAD-CAM field/**102**

## INSIDE

■ General Electric Information Services Co. expects its value-added network, electronic mail and clearinghouse systems businesses to each reach \$100 million by 1990/**107**

■ With \$14 billion in hard currency reserves, the Peoples Republic of China presents an interesting trade prospect for micro vendors/**108**

■ For the third time this year, Trilogy Ltd. revised its shipment schedule of the processor that will be built around its "wafer-scale" semiconductor technology, falling 2½ years behind initial projections/**109**

## Study warms up to Frost Belt states as sites for manufacturing concerns

**CHICAGO** — Sun Belt states remain most hospitable to manufacturers, but parts of the Frost Belt have "warmed considerably," according to a recent study of manufacturing business climates in the 48 contiguous states.

The fifth annual study, "1983 General Manufacturing Business Climates Study," released last month by Alexander Grant & Co., a national accounting and consulting firm, ranked the 48 states according to 22 factors grouped among five categories. Rankings were compiled by a mathematical formula based upon the percentage weighting placed on each category and factor by 32 state manufacturers' associations consulted by the company.

Florida in 1983 retained its overall No. 1 ranking as the state with the most hospitable climate, while Michigan in 1983 retained the distinction of being the state

with least hospitable climate. In terms of government-controlled factors, Arizona was ranked most hospitable, and Wyoming was ranked least hospitable.

On a regional basis, the Southeastern states performed best from a business perspective, followed in descending order by the South Central states, the North Central states, Southwestern, Mideastern, New England, Western and Great Lakes regions.

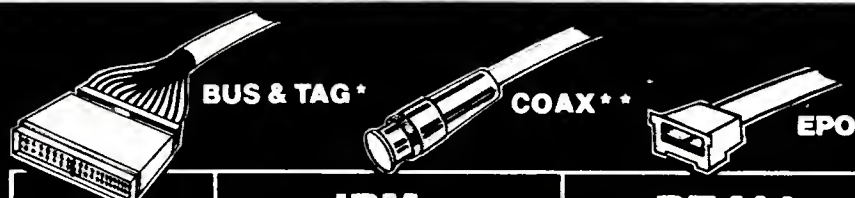
Selwin Price, partner in charge of the study, cautioned that the study is not an all-encompassing device for measuring manufacturing business climates, but focused on quantifiable factors measuring the costs of doing business and availability of resources.

While seven of the top 10 ranked states are in the South and West, the second

See **REGION** page 119

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## COMPUTER INDUSTRY

# Prime bets on demand for CAD/CAM integration

By Peter Bartolik  
CW Staff

NATICK, Mass. — Computervision Corp. may have IBM on its team, but Prime Computer, Inc. believes a fully compatible, that is, proprietary, product array with a focus on integration will be the key to success in the world of computer-aided design and manufacturing (CAD/CAM) and computer-aided engineering.

In a press briefing just two weeks after Computervision announced a high-end system based on IBM 4300 series processors [CW, May 7], Prime officials said their company's goal is to offer integration of hardware, systems software, applications software and workstations. Eschewing the turnkey approach of adding value to equipment procured from others, Prime is intent on providing "a full product line fully compatible from top to bottom," according to Bud Enright Jr., corporate vice-president and president of the CAD/CAM Business Group.

A separate business unit, the CAD/CAM group was officially credited with generating 16%, or \$65 million, of Prime's total revenues in 1983, but may actually have generated closer to \$80 million to \$90 million, Enright said. Prime's CAD/CAM sales are growing at a 60% annual rate, and "it is not unreasonable to expect" those sales could represent 50% of Prime's total revenues in

three to five years, he added.

The briefing was held on a day when the price of Prime stock dropped more than \$1. That drop was generally accredited to a recommendation by a Hambrecht and Quist analyst (based on an analysts meeting with Prime officials the previous day) that investors sell Prime stock; based on his perception, the company was losing market share. Prime denied it had said anything to prompt that perception.

CAD/CAM is a principle thrust of Prime's strategy. Customers will opt for total solutions provided by systems suppliers when offered an opportunity to integrate CAD/CAM through applications, communications and networking, Enright said. "We're betting our investments" on the belief that CAD/CAM will follow office automation on the path to totally integrated systems, he said.

The company believes it has the operating system (Primos), data base management products, networking and communications products to fill the need for totally integrated CAD/CAM systems. In recent years, the company has acquired and produced a variety of CAD/CAM applications, filled out its processor lineup and now will concentrate on workstation offerings — its own and those of third parties — and integration, Enright said.

A key element of Prime's decision

to focus on integration of proprietary products is the belief that "exploitation" of workstation technology will produce more sophisticated workstations that will house some of the applications, leading, in essence, to distributed CAD/CAM data systems.

Other elements are the profit po-

tential of controlling the equipment and software and the benefit of a cohesive marketing program. In contrast, Enright said, Computervision "has a rather elaborate product strategy. . . . I think they've got a different kind of a marketing problem; we're counting on that."

## AM International files amended reorganization plan with court

CHICAGO — AM International, Inc., a manufacturer of business graphics computer equipment, recently filed an amended reorganization plan and disclosure statement with the U.S. Bankruptcy Court.

The plan reportedly includes provisions for the settlement of about \$285 million of pre-Chapter 11 indebtedness.

The plan calls for a cash payout of approximately \$201 million and distribution of approximately 40 million shares of new common stock, according to a spokesman for the company.

The cash would come from internally generated funds and the recently completed termination of the company's comprehensive retirement

plan, the company said.

An additional \$50 million will come from new secured borrowings from sources other than prepetition claimants and the sale of new common stock to an employees' stock ownership plan, according to the spokesman for the company.

Before court approval, the plan must be accepted by the firm's creditors.

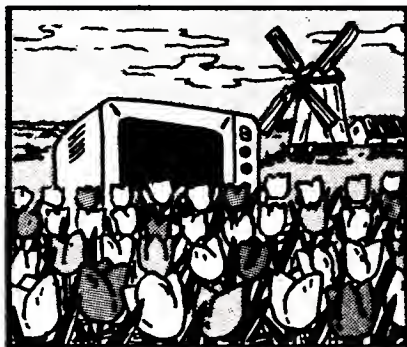
In addition to this, the plan must be accepted by stockholders who hold at least two-thirds in amount of allowed stockholders' interests who vote on the plan.

The claims of the unsecured creditors must not exceed \$275 million, the company said.

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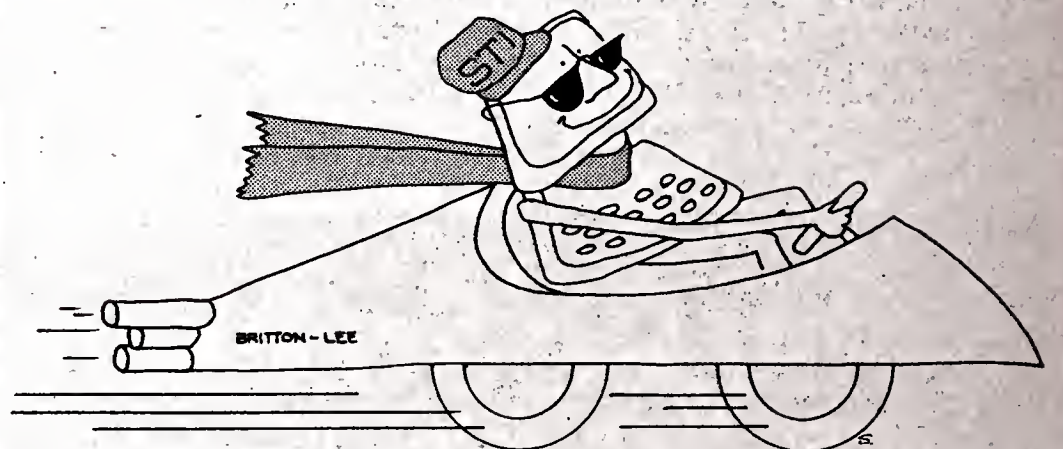
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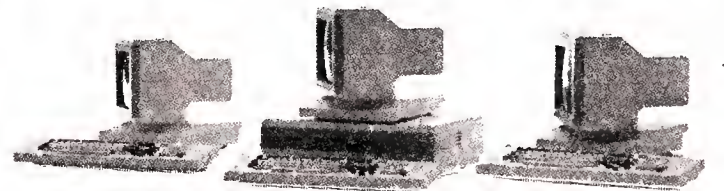
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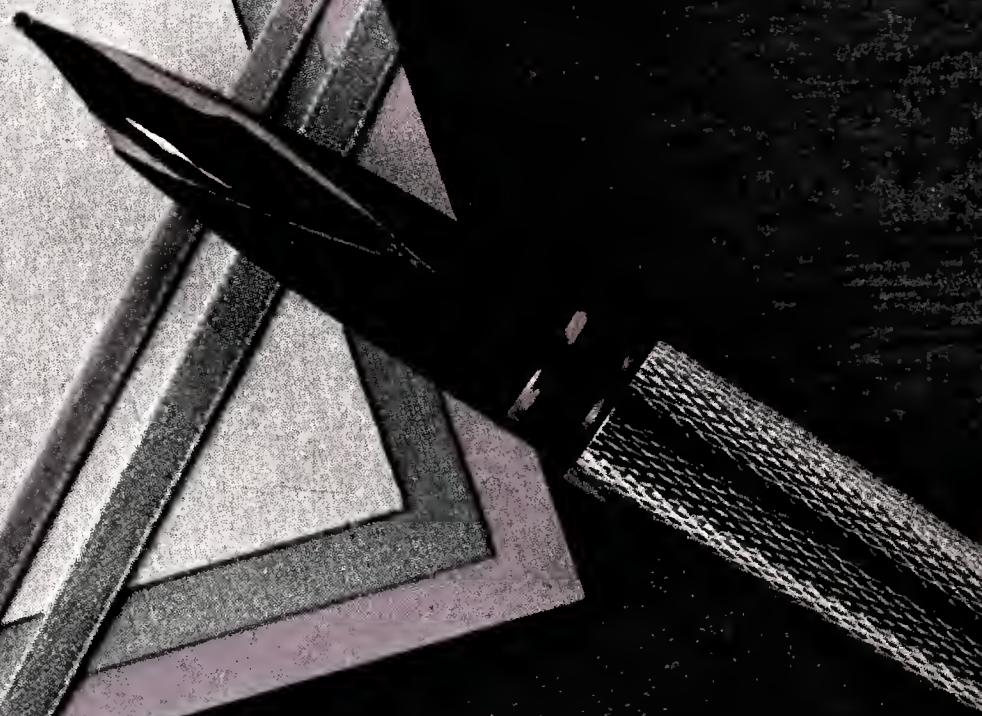


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## COMPUTER INDUSTRY

# Geisco divisions set sights on \$100 million by 1990

By David Myers  
CW New York Bureau

NEW YORK — General Electric Information Services Co. (Geisco) expects each of its value-added network, electronic mail and clearing-house systems businesses to reach \$100 million by decade's end, Geisco President Walter W. Williams told securities analysts recently.

Geisco, which recently announced commercial availability of time on its information network [CW, April 16], has 20% of excess capacity on its old internal time-sharing network to sell on the open market, according to Williams. But the real challenge is not preventing prime-time overloads of the network when that last 20% is filled, but rather finding ways to shift usage to non-peak hours, Williams said.

Contrary to most industry analysts' belief that no information networking service has yet turned a profit, Williams insisted that his company's information net "is the most profitable part of Geisco." He would not disclose profit amounts.

As part of an all-morning presentation by General Electric Co.'s Services and Materials Sector to stock analysts here, Williams said Geisco's information services business chalked up \$600 million in revenues last year, with a 5% return on sales. The packaged software side of Geisco's business contributed \$50 million in sales last year, Williams added.

Asked if Geisco felt unenthusiastic about its chances in the crowded microcomputer software market, Williams replied, "We are not unenthusiastic. While it's true

that there are relatively few \$100 million [micro software] companies and thousands of players, that market is huge and growing. We are going to step back and look at the industry and determine where the best play by GE is in that arena."

Williams predicted that Geisco would rank first in

electronic mail by 1989 and said that, among its rivals in information services, IBM "is not one that makes us run for cover."

Lawrence A. Bossidy, executive vice-president of GE and leader of the Services and Materials Sector, disclosed that Geisco is eyeballing data base companies for

possible purchase. "We have no venture to announce and no obligations," Williams later elaborated.

Other executives in the GE sector pointed out that the Fairfield, Conn.-based corporate giant also makes 60% of the computer terminal housings in the data processing industry. Its venture capital

firm, Gevenco, invested \$88 million in computer, electronics and telecommunications start-ups last year.

GE views its venture capital efforts as a way of keeping the corporation posted on new developments in technology, according to Harry T. Rein, president and chief executive officer of Gevenco.



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## Texas firms form DP association

AUSTIN, Texas — An association called the Texas Computer Industry Council has been organized for computer companies based in Texas.

The council said it will monitor legal, legislative and regulatory developments that affect operations of computer-related companies that do business in the state.

M. L. Bradley, group vice-president of Informatics General Corp. in Dallas, was named interim president of the council.

Among the companies participating in the council are Xerox Corp., TRW, Inc., Handle Corp., KMW Systems Corp. and Statcom Corp.



## COMPUTER INDUSTRY

# Expanding Chinese micro mart triggering trade frenzy



## OUTSIDE LINES

Bohdan Szuprowicz

President Reagan's visit to China once again focused the attention of the world on that potentially colossal market. Many traders see China as the largest market in the world for personal computers.

China's trade has been on an upswing since 1982, the year of its accumulated record hard-currency reserves of \$14 billion. The current Five-Year Plan, 1981-1985, calls for a steady growth in imports and talks about spending \$1 billion in 1984 alone on 1,000 advanced technology items, with a promise of even more to come in 1985.

Nevertheless, at the outset of the 1980s, China — compared with countries like Greece or Egypt — was still a minor high-technology import market when computers, office machines, microchips and telecommunications were all put together.

During the last few years, several thousand microcomputers have been sold to China. These originated from such diverse countries as Australia, Brazil, Canada and New Zealand, not to mention the U.S., Japan and France — traditionally the leading exporters of computer equipment to China. Not unexpectedly, Japan captured about 50% of all such exports to China and appears to be on its way to becoming the largest supplier and joint manufacturer of microcomputers in China.

Apparently, there are already so many Apple Computer, Inc. computers in China that a Chinese-language periodical titled "Apple Orchard" has been announced and will be distributed free to Chinese Apple end users. There is also a Wang Laboratories, Inc. users group operating in China, while larger computer manufacturers are rushing in to establish computer and software centers to support their equipment and promote its use. Some are signing joint agreements with China to manufacture their micros there, where costs of assembly can be as low as 50% of what they are elsewhere.

### Soliciting joint ventures

The Chinese are in fact actively soliciting the establishment of joint ventures to manufacture microcomputers in China and in some instances are even willing to consider 100% ownership by foreign partners as long as they bring in the latest microcomputer manufacturing technology and are willing to guarantee an export market for the end product. Some Western firms like Commodore Business Machines, Inc. and Sinclair Ltd. have already reached agreements to assemble components or whole micros in China, while Sanyo of Japan will manufacture its desktop personal computers at the Beijing Computer Industry Co.

China is clearly positioning itself as a major future microcomputer off-shore manufacturing country. Be-

cause of its huge domestic market potential and very low labor costs, it is in a position to offer manufacturing economies of scale not possible in other countries of the world except perhaps India.

China's Committee for Science and Technology recently announced that China's hardware industry is to concentrate on developing micros, even at the expense of minicomputer and large computer manufacture.

This trend is also evident in China's electronic industry reorganization of recent years and in the development of at least 20 domestic microcomputer models that are now going into production in at least a

dozen factories. The DJS-050 micro series is based on a Chinese copy of the famous 8-bit Intel Corp. 8080 microchip, and the Beijing Wire Communications Plant recently announced the new Great Wall 100 micro, which is a 16-bit IBM Personal Computer-compatible unit.

Actually, the Chinese announced trial production of their first DJS-050 micro as far back as April 1977, which, incidentally, was the same month that Stephen Wozniak showed his first Apple models to the public at the West Coast Computer Faire in San Francisco. Since then, the Chinese have been busy beefing up integrated-circuit manufacturing capa-

bilities as a basis for creating the microcomputer industry. They also imported large quantities of Motorola, Inc. 6800 and Zilog, Inc. Z80 microchips, which are used in the manufacture of the Chinese DJS-060 series and the BCM-I and BCM-II personal computers.

China may also emerge as an even greater market for portable microcomputers of all types, which should be particularly useful in a country where electric power is still in short supply and the telecommunications infrastructure is in its infancy.

In the meantime, China fever is gripping the microcomputer industries of the world, and the rush is on.

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IBM  
AT&T  
Northern Telecom  
Rolm  
Lee Data  
GTE  
Mitel



## COMPUTER INDUSTRY

# Trilogy wafer-based processors delayed until 1987

By Peter Bartolik  
CW Staff

CUPERTINO, Calif. — In its third schedule revision this year, Trilogy Ltd. revealed recently that the large-scale processors to be built around its wafer-scale semiconductor devices will not be shipped until 1987, 2½ years later than originally planned.

The latest revision was not the result of any underlying technological problem and is not expected to reduce the company's potential impact on the large processor market, according to Russell Drew, Trilogy vice-president for investor relations.

The revised shipment schedule includes longer time periods to "check

out" the prototype processor and programming systems, among other things, Drew said. In addition to the latest revision, Trilogy had announced earlier in the year [CW, Jan. 23] the first delay, pushing back the shipment date from the third quarter of 1985 to the fourth quarter of 1985; the company at that time said it experienced problems with the prototype wafer-scale chip, but later said those problems were solved.

The latest delays resulted from a design and production review initiated two months ago, Drew said, when the company announced [CW, March 12] it was pushing back the scheduled shipment date to mid-1986 and

had revamped its product strategy by planning on a dyadic (dual-processor) configuration, rather than the original uniprocessor configuration. Trilogy also announced in March it had simplified the design process of its wafer-scale integration to make the semiconductors more suitable for use in other computers.

In announcing the latest product delay, the company said it may also seek to market the wafer chip before its own processor is shipped. The much heralded wafer-scale integrated circuits reportedly would cram the capacity of 100 integrated circuits on one 2½-in. wafer. Four companies have already invested funds

for rights to that technology: Sperry Corp., Digital Equipment Corp., CII-Honeywell Bull and Control Data Corp.

Drew said the company has the resources to continue its production plans through the third quarter of 1985 and is presently reviewing various financial sources to prepare a financial plan beyond that date; the new financial plan should be completed within 90 to 120 days, he added.

The company announced it had suspended a plan to offer 6.8 million shares of its common stock in exchange for outstanding limited partnership interests of Trilogy Computer Development Partners Ltd.

Despite much speculation about Trilogy's ability to market its product in a timely manner to compete with IBM, the company does not appear to be worried that the product will be bypassed by other vendors. Trilogy's processor reportedly would offer in excess of 40 millions of instructions per second, and Drew said the market for large machines of that type is projected to grow at an annual rate of 45% to 50%. "We think there will be a large market," he said.

# Here are some companies that you can talk to about solving your voice and data communications problems. Now.

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## Oki, Intel ink Cmos agreement

By Robert Batt  
CW West Coast Bureau

SANTA CLARA, Calif. — Oki Electric Industry Co. Ltd., the Japanese semiconductor manufacturer, has been given the go-ahead by Intel Corp. to manufacture and market Cmos versions of Intel microprocessors, microcomputers and related peripheral devices.

Under the terms of the agreement between the two companies, announced at a recent press briefing here, Oki is licensed for worldwide manufacture and sale of the Intel 80C86 and 80C88 16-bit microprocessors and their peripheral and support circuits, Cmos versions of the Intel 8085A 8-bit microprocessor and its peripherals, Cmos versions of the Intel 8-bit microcomputers — 80C48, 80C49 and 80C50 — and the Intel 80C51. The latter device is to be manufactured with Oki's micron Cmos technology.

Explaining Intel's decision to cooperate with Oki, Dave House, vice-president of Intel's Microcomputer Group, said the U.S. manufacturer is committed to a policy of broad second-sourcing on key products in order to ensure worldwide availability.

Oki designs, manufactures and markets very large-scale integrated Cmos circuits for use in computers, telecommunications systems and consumer products. The company reported worldwide sales last year of \$1.3 billion.

Its two semiautomated facilities produce devices in the 2- and 3-micron class on 4- and 5-in. wafers, and present output is said to exceed 100,000 wafers a month, with near-term plans to expand this capacity to 160,000 wafers a month.

Intel sales in 1983 were \$1.1 billion.



## COMPUTER INDUSTRY

# Commerce establishes science and electronics office

To promote foreign trade, advocate and develop U.S. export policies

By Bryan Wilkins  
CW Washington Bureau

WASHINGTON, D.C. — A new industry liaison office has been formed within the U.S. Department of Commerce to promote foreign trade and help U.S. electronics manufacturers enter restrictive foreign markets.

Operating within the International Trade Administration (ITA), the Office of Science and Electronics will provide analysis and policy-making functions in the formation of U.S. negotiating positions with the State Department and the office of the U.S. Trade Representative.

The Office of Science and Electronics will act, according to top Commerce officials, as the voice within the executive branch representing the computer and electronics point of view.

"In the past, this point of view has effectively lost out," because of conflicting roles divided within the Commerce and State Departments and the U.S. Trade Representative's office, explained John Calhoun, acting assistant secretary of the new office.

Under Calhoun, the Office of Science and Electronics consists of four divisions: Office of Computers and

Business Equipment, Office of Components and Related Equipment, Office of Telecommunications and the Office of Instrumentation and Medical Sciences.

Calhoun said the impetus for the formation of the new office to promote U.S. exports came as a result of the steadily deteriorating balance of trade in electronics, especially with regard to Japan. Commerce Department trade figures show Japan's exports to the U.S. exceeded U.S. trade exports to Japan by \$8.7 billion.

Calhoun added that Commerce projects the U.S. to show for the first

time a negative trade balance in electronics and computers this year.

A formally chartered industry advisory commission has been established to act with the ITA's Office of Science and Electronics in devising an approach to develop and promote U.S. exports, as well as monitor foreign tariff barriers.

"We don't support the building of tariff barriers in this country, and our goal is to eliminate these barriers in other countries," said Calhoun, who is on leave from Intel Corp., where he is business development director.

## Announcing The Computer Show that takes the work out of going to computer shows

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Plus, we'll make sure you don't waste a minute of your precious time wandering around the show hall looking for the exhibits or conferences you've been wanting to see for months. The PC World Exposition format is streamlined for you. Exhibits are easy to find; conferences are scheduled at sensible times.

Put simply, the PC World Exposition is the computer show run by professionals, for professionals. Why waste a day or a single dollar at any other show?

Following is a sampling of the conference sessions:

- Introduction to Personal Computer Communications

- DP/MIS Forum: Industry Issues in Corporate PC Use
- Compatibility Issues for the Corporate PC User
- The Anatomy of the IBM PC: A Users' Guide to Components and Functions
- The PC as the Basic Small Business Information System
- Selling to the Corporate Account
- Project Management Software
- Integrating Business Applications in the Corporation: Word Processing/Spreadsheet Applications
- The IBM Family Tree from PCjr to the XT
- Investment Software for Individuals and Small Businesses
- Local Networks for PCs
- Manufacturing Resource Planning with the PC
- Integrating Business Applications in the Corporation: Data Base Management/Business Graphics Applications
- Inventory Control and Shipment Applications
- What's New in Portable and Kneetop Computers

**Featured Speakers:**  
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"The Micro/PC Industry: IBM Domination and Future Direction."  
David Bunnell, Publisher of PC World magazine  
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"Survival Strategies for the PC Marketplace."

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## Perkin-Elmer reports increase in net income

NORWALK, Conn. — Perkin-Elmer Corp. recently reported net income for the third quarter ended April 30 was \$13.8 million, or 31 cents per share, a 10% increase over the year-earlier results of \$12.5 million, or 28 cents per share.

Revenue for the quarter was \$297.8 million, in comparison with year-earlier revenues of \$254.8 million, representing an increase of 16.8%.

Robert H. Sorenson, chairman and chief executive officer, noted the company's high level of orders, \$325 million in the quarter, compared with \$252 million one year ago, and backlog of \$499 million.

According to Sorenson, orders were up for all of the company's units except for the West German electronics affiliate.

## Telex groups air profit jumps

TULSA, Okla. — The Telex Computer Products, Inc. subsidiary of Telex Corp. reported a 58% pretax profit increase for fiscal year 1984 ended March 31, as revenues increased by 15% over the previous year.

The subsidiary reported revenues of \$243.9 million, compared with \$211.6 million for the previous year. Income before taxes and excluding an extraordinary item was \$53.5 million in 1984, compared with \$33.8 million in 1983.

Another Telex subsidiary, Telex Communications, Inc., reported 1984 revenues of \$81.5 million, a 29% increase over the previous year, and income before income taxes of \$10.9 million, a 78% increase over the previous year.

Telex Corp. reported 1984 revenues of \$325.4 million, an 18% increase over the previous year revenues of \$274.8 million.

Profits after income taxes were \$36.1 million, a 47% increase over the previous year.



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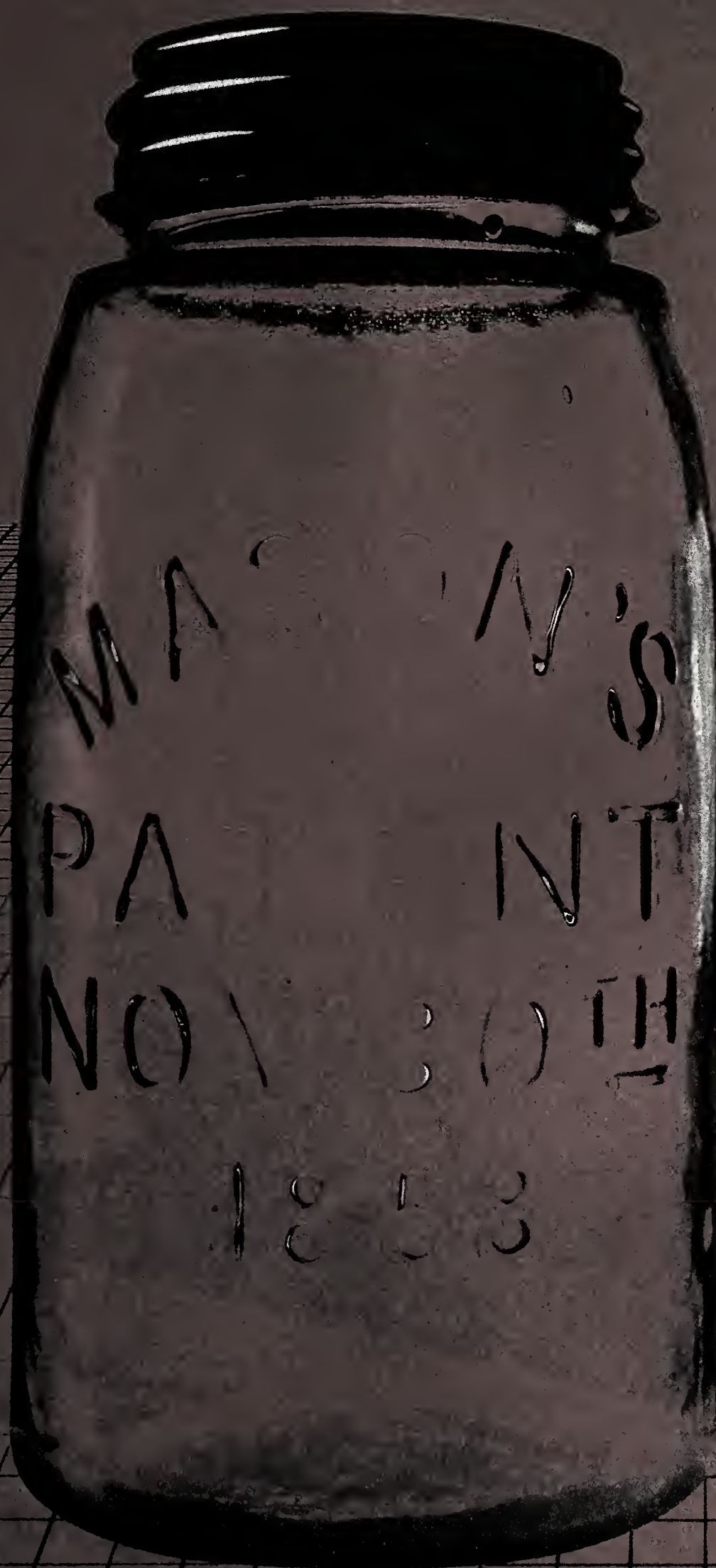
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The Reliable Software Technology Company



## COMPUTER INDUSTRY

## Visual Technology profits, revenue down

TEWKSBURY, Mass. — Visual Technology, Inc. reported a 92% decrease in net income and a 5% drop in revenues for the quarter ended March 31.

Net income for the quarter was \$72,000, or 2 cents a share, compared with \$902,000, or 24 cents a share, in the year earlier period.

Revenue for the quarter fell to \$11.49 million from \$12.09 million a year ago.

Thomas R. Foley, president and chief executive officer, claimed the disappointing results had been expected because of additional production and marketing expenses for its Commuter microcomputer.

"[The] start of Commuter

production is now imminent," Foley said, "and this period of investment without revenues will soon be behind us.

"We expect to return to historical profit margins ... by the third quarter," Foley added.

## AMS sees mixed first-quarter profits

ARLINGTON, Va. —

American Management Systems, Inc. (AMS) announced recently that in the first quarter ended March 31, its Computer Services segment experienced a 41% decline in profits compared with a year ago, but that improved performance in other company segments produced an over-

all 29% increase in profits.

Total company revenues for the quarter were \$20.9 million, up 12% from \$18.6 million one year ago, and profits increased to \$449,000, or 27 cents per share, compared with \$349,000, or 21 cents per share, for the period one year ago.

The Computer Services segment suffered a 9% drop in revenues to \$10.4 million, and profit from that segment was \$655,000, down from \$1.1 million a year earlier.

Offsetting the decline were increased profits and revenues from the Custom Systems and Packaged Systems segments.

## Boeing will resell XT/370

VIENNA, Va. — Boeing Computer Services Co. will remarket the IBM Personal Computer XT/370 as a business management workstation that provides an extension of its mainframe-based EIS decision support system.

Boeing announced the signing of the agreement with IBM May 4 as part of its first offering under a value-added dealer arrangement it reached with the computer manufacturer.

EIS combines the functions of business modeling, report writing and graphics with a multidimensional data base structure. The IBM XT/370 will permit the user to develop these models locally, Boeing said.

## Battelle runs study

COLUMBUS, Ohio — Battelle Memorial Institute has begun a study to assess the market and applications for computer image processing equipment and software through 1990.

The study will reportedly analyze the needs in image processing applications, identify technological trends, assess segmented markets and develop business strategies.

Participation in the 10-month study is open. A basic subscription costs \$17,800. The cost for worldwide markets is \$23,000.

More information is available from Battelle Memorial Institute, 505 King Ave., Columbus, Ohio 43201.





# CBS-IBM-Sears videotex venture christened Trintex

WHITE PLAINS, N.Y. — Trintex, A CBS-IBM-Sears Co., is the name selected by IBM, Sears Roebuck & Co. and CBS for the videotex joint-venture operation announced in February.

Theodore C. Papes Jr., the IBM vice-president who was pulled from his position as group executive of the Information Systems Group to become president of Trintex, announced recently that the videotex venture will be headquartered here and that a number of vice-presidents have been named from the ranks of the three companies.

James M. Hewitt, formerly vice-president of IBM's International Network, was named Trintex vice-president of systems development; Hyde C. Perce, formerly Sears' director of corporate financial analysis, was named vice-president of finance and planning; George M. Perry, formerly vice-president and general counsel of Kaiser Steel Corp. before joining CBS for assignment to Trintex, was named vice-president and general counsel; Gene F. Ryzewicz, formerly director of electronics and communications planning with Sears, was named vice-president of marketing; and Harry E. Smith, formerly CBS vice-president of new business development and general manager of its Venture One videotex development program, was named vice-president of videotex publishing.

Papes, who remains a vice-president with IBM, also announced that Venture One has been assigned to Trintex and will continue working from Fair Lawn, N.J.

## Lear Siegler Quality and Reliability You Trust. High Touch™ Style You'll Prefer.

This new generation of Lear Siegler video display terminals brings elegant High Touch™ style to our American Dream Machine (ADM™) tradition. The family features three new ergonomic terminals designed to meet the needs of OEMs and end users alike: the ADM 11, the ADM 12 and the ADM 24E.

Here is a whole new way for terminals to relate to people. Dozens of little touches add up to the convenience and comfort of High Touch. For example, we put the power "on/off" switch and contrast control knob in front where they're easy to reach.

The monitor not only tilts and swivels, it stops positively in almost any position.

The clean, crisp display features a large character matrix on an easy-to-read green or amber non-glare screen—made even easier to read by the hooded bezel. Screens are available in 12" or 14" sizes.

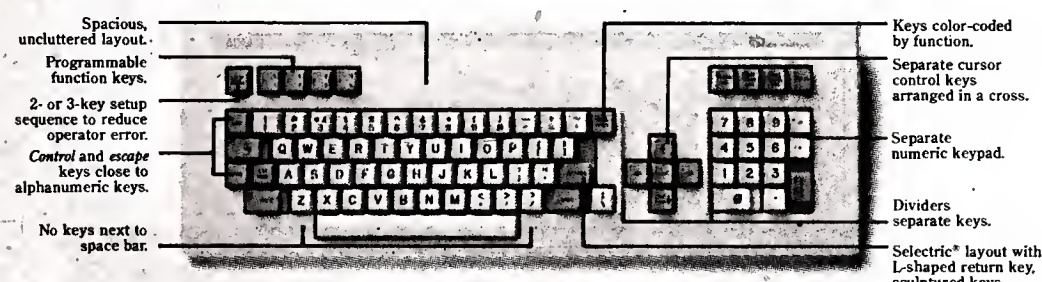
You get the best in style and ergonomics, plus all the outstanding performance features you'd expect from Lear Siegler (see chart).

Lear Siegler High Touch terminals are backed by the broadest network of full service centers anywhere, serving 3000 cities nationwide. And they're made in America—designed, engineered, manufactured and shipped from Anaheim, California to provide you with the best local support.

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Lear Siegler's new VersaPrint™ 500 Series printers combine with Lear Siegler video display terminals for hard copy output.



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|  | ADM 11  | ADM 12   | ADM 24E   |
|--|---|--|---|
|  | Conversational  | Editing  | Host Programmable   |
| Programmable Function Keys   | 4 (Shiftable to 8)  | 16 (Shiftable to 32)   | 16 (Shiftable to 32)  |
| Non-Volatile Function Keys   | Optional  | Standard   | Standard  |
| Function Key Legends on 25th Line  | From Host   | From Host  | Standard Non-Volatile   |
| No. of Pages of Display Memory   | 1   | 2  | 2 or 4  |
| Display Memory Configurations (Plus 25th Message/Status Line)  | 24 Lines by 80 Characters   | (2) 24 x 80 or (1) 48 x 80 or (1) 24 x 158                                     | User Definable up to 96 x 80  |
| Scrolling  | Standard Scrolling  | Smooth, Jump or Horizontal Scrolling Split Screen                              | Smooth or Jump Scroll Split Screen  |
| Transmission Mode  | Conversation Mode   | Conversation or Block Mode   | Conversation or Block Mode  |
| Editing  | Limited   | Full Editing & Protected Fields  | Full Editing & Protected Fields   |
| Visual Attributes: Reduced Intensity, Blink, Blank and Reverse Video. Underline also on ADM 12 and ADM 24E | 3 Embedded 1 Non-Embedded   | 4 Embedded, 1 Non-Embedded or All Non-Embedded, plus Full Screen Reverse Video | 5 Embedded, 1 Non-Embedded or All Non-Embedded, plus Full Screen Reverse Video and Highlight  |
| OEM Flexibility  | Modifiable Set-Up Characteristics   | Modifiable Set-Up Characteristics & Personality                                | Modifiable Set-Up Characteristics. Add to Program in ROM or Down-Line Load in RAM (56K ROM or RAM. Up to 22K Display Available) Room for additional Logic Boards. |
| Terminal Compatibility   | ADM 3A, ADM 5, ADDS Viewpoint & Regent 25, Hazeltine 1400, 1420 & 1500, also available. | ADM 3A, ADM 5, ADM 31, ADM 32  | ADM 3A, ADM 5, ADM 31, ADM, 32, ADM 42  |

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## Judge fines Swedish firm \$3.12 million

WASHINGTON, D.C. — A federal judge last month fined Sweden's Datasaab Contracting A.B. \$3.12 million for illegally exporting sensitive U.S.-made electronic equipment to the USSR between 1977 and 1980.

Datasaab is a subsidiary of L.M. Ericsson, A.B., the Swedish telecommunications company. Ericsson acquired Datasaab in 1980.

The fine was the largest criminal penalty ever imposed for violating the U.S. export control law covering the sale of strategically important materials to the USSR.

U.S. District Court Judge Gerhard A. Gesell accepted Datasaab's plea of no contest to criminal violations of the Export Administration Act. Under the law, Datasaab could have been fined as much as \$15.6 million.

The U.S. government charged that Datasaab bought parts in the U.S. for a sophisticated computerized radar system and shipped them to the USSR in violation of an export license granted in 1977.

## Krist named AEA director

PALO ALTO, Calif. — The American Electronics Association (AEA) has named William K. Krist as its director of international affairs.

Krist, formerly an assistant trade representative for industrial trade policy in the Office of the U.S. Trade Representative, will be responsible for representing the AEA in dealings with U.S. and foreign governments, trade associations and international organizations such as the United Nations.

He also will assist the AEA in developing policies for foreign trade and national competition.



## COMPUTER INDUSTRY



## MERGERS AND ACQUISITIONS

TRW, Inc. and Trico Industries, Inc. reported that they have terminated negotiations calling for the acquisition of Trico by TRW. However, the companies expect to continue exploring various options regarding their relationship.

Business Computing International, Inc. (BCI), New York, announced an agreement to acquire the assets of Middle East Software Corp. (Mesc), Cambridge, Mass. Under the terms, Mesc will receive 100,000 shares of BCI common stock and an option for three years to purchase another

400,000 shares. Also, BCI will pay royalties on any Mesc Arabic software it sells over the next 10 years in the Middle East.

Perkin-Elmer Corp., Norwalk, Conn., has acquired Nippon Instruments Corp., Japan. Nippon will be renamed Perkin-Elmer Semiconductor Service Ltd. and will provide technical service support for PE's line of optical lithography systems, etching systems and sputtering machines. Terms of the sale were not available.

Fairchild Industries, Inc., Germantown, Md., announced a lease/purchase agreement with Tektron Micro Electronics, Inc. that would permit Fairchild to acquire the privately held Lanham, Md., firm. Fair-

child will invest \$2 million over the next two years for equipment that will be leased to Tektron. In return, Fairchild will receive lease payments and warrants to buy up to 25% of the company.

Grumman Corp., Bethpage, N.Y., announced it has acquired the Computer Systems Support Corp., Gaithersburg, Md. Financial terms were not available.

Continuum Co. announced the closing of an agreement for the purchase of the 946,990 Continuum common shares owned by National Investors Life Insurance Co.; 205,867 shares will be purchased by Continuum for the amount of \$5 million and then will be canceled. The remaining shares will be purchased for \$18 mil-

lion by an investor group.

Gerber Scientific, Inc., South Windsor, Conn., announced that its wholly owned subsidiary, The Gerber Scientific Instrument Co., also of Windsor, has agreed in principle to acquire American Hoechst Corp.'s Bocom Electronic Systems Division of Tustin, Calif., for cash.

Genrad, Inc., Concord, Mass., announced its acquisition of Cirrus Computers Ltd., Phoenix, as a wholly owned subsidiary. The acquisition was accomplished through the exchange of an undisclosed amount of Genrad stock. The new name for the subsidiary is Genrad Designs, Inc.

Condec Corp. announced it has an agreement merger with Farley Acquisition Subsidiary Corp. Under the terms, Condec's outstanding shares of common stock would be converted to \$29 per share in cash. A meeting of stockholders to consider and act on the merger will be held in early June.

Technology Marketing, Inc. (TMD), Irvine, Calif., announced it has signed a letter of intent to acquire Compucable Corp., Anaheim, Calif., for 900,000 shares of TMD's common stock. Completion is subject to a definitive agreement and approval by the shareholders of both corporations.

Nationwide Telecommunications, Inc. (NTI), Fairfax, Va., announced that its Dial America long-distance service has been acquired by WUI/TAS, Inc., New York. The acquisition involved an undisclosed amount of cash and stock in WUI/TAS. Dial America's name will be changed to Businessline.

Keene Corp., New York, has acquired Versitron, Inc., Washington, D.C. Versitron is a producer of solid-state fiber-optic communications devices. Terms of the sale were not available.

Citicorp Information Services, New York, a business unit of Citibank and Citicorp Capital Markets Group, announced the acquisition of the assets of Gemnet Software Corp., Ann Arbor, Mich. Terms of the acquisition were not available.

International Harvester Co. (IH), and Icom, Inc. announced the sale of IH's telecommunications system to Icom. As part of the agreement, IH will continue to use the network as a customer of Icom for an extended period of time. The terms of the acquisition were not disclosed.

Technicom International, Inc., Darien, Conn., announced an investment in Micro Computer Systems, Inc., Greensboro, N.C., and the formation of Technicom Systems, Inc. Under the terms of the arrangement, Technicom International has the right to purchase the remaining equity interest in Micro Computer Systems at a later date.

Magnetic Controls Co., Minneapolis, announced an agreement to acquire TMS Systems, Inc., Waltham, Mass. Terms of the agreement call for payment of an undisclosed amount of cash and Magnetic Controls common stock to John Dretler, See MERGERS page 116

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## COMPUTER INDUSTRY



## EXECUTIVE CORNER

**Robert G. Todd Jr.** has been appointed president and chief executive officer of Flextronics.

**Geoffrey Salkeld** has been appointed president of Integritek, Inc., and **David B. Dibble** has been named chairman.

**Stanley H. Reese** has been named vice-president for communications products at Western Digital Corp.

**Gordon H. Gagnon** has been appointed vice-president of field engineering at NBI, Inc.

**Loring B. Lyons** has been named vice-president of countertrade at Honeywell High-Tech Trading, Inc.

**Ricardo A. Diaz** has been appointed vice-president of manufacturing programs on the corporate staff of Harris Corp.

**James Spillars** has been named executive vice-president at CDI Information Systems, Inc.

Convergent Technologies, Inc. announced the following management changes: **Pauline Alker**, vice-president and general manager, Special Products Division, has resigned effective May 4; **Matt Sanders** has been appointed vice-president and general manager, Special Products Division; **Owen Brown**, vice-presi-

dent and general manager, Advanced Information Products Division; **Sam Bernstein**, vice-president of marketing, Advanced Information Products Division; and **Dave Kaplan**, vice-president and general manager, Data Systems Division.

**Dr. Ronald E. Foerster** has joined CXC Corp. as vice-president, research and development.

**Samuel Broydo** has joined Zymos Corp. as vice-president of technology.

**Timothy J. Zier** has been appointed to vice-president of finance and administration at Redwood Software.

**Richard G. Knoblock** has been appointed president of the Data Prod-

ucts Division of Lear Siegler, Inc.

**Peter C. Dunham** has been appointed vice-president of hardware and systems development at Link Telecommunications, Inc.

**Dr. Gerry O. Walter** has joined Integrated Automation as vice-president and chief scientist, Docuvision Division.

**Wilfred G. Sardelli** has joined System Development Corp. as vice-president, corporate planning and acquisitions.

**William J. Chavez** has been named vice-president of finance and chief financial officer for Vynet Corp.

**Kenneth R. Churilla** has joined Creative Strategies International as vice-president and manager of the microcomputer industry research group.

**J. Fred Bucy** has been named chief executive officer of Texas Instruments, Inc.

NCR Corp.'s shareholders at the annual meeting recognized outgoing **William S. Anderson's** 38-year career and welcomed **Charles E. Exley Jr.** as the new chairman of the 100-year old company, the founding member of the business machine industry.

**Lorraine Mecca** has been appointed vice-chairman of Micro D, Inc., and **Richard G. Lionetti** will be president and chief operating officer, effective May 1.

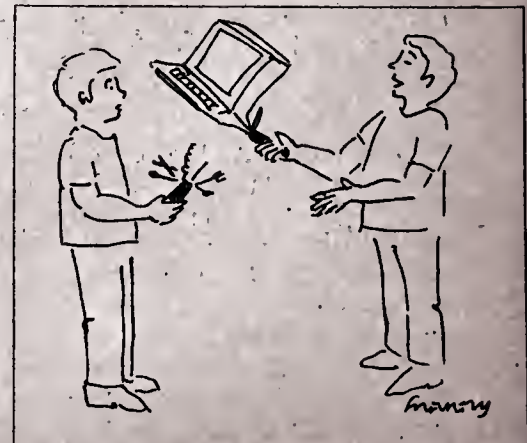
**F. Stephen Wyle** has been appointed to chairman and chief executive officer at Lisp Machine, Inc.

## MERGERS from page 114

founder and shareholder of TMS Systems, based on future TMS earnings.

**Floating Point Systems, Inc.** has increased its investment in **Lattice Semiconductor Corp.** by \$2.5 million. As part of the agreement, Floating Point may purchase up to one-tenth of Lattice's wafer fabrication capacity for its high-speed computer products.

**Ultimate Corp.**, Clark, N.J., signed a letter of intent to acquire **General Computing Services (Australasia) Pty. Ltd.**, Perth, Australia. The acquisition of General Computing Services will provide Ultimate with a strong base for expansion in Southeast Asia and the Pacific Basin. Finalization is dependent on execution of a definitive agreement and obtaining certain governmental approvals.



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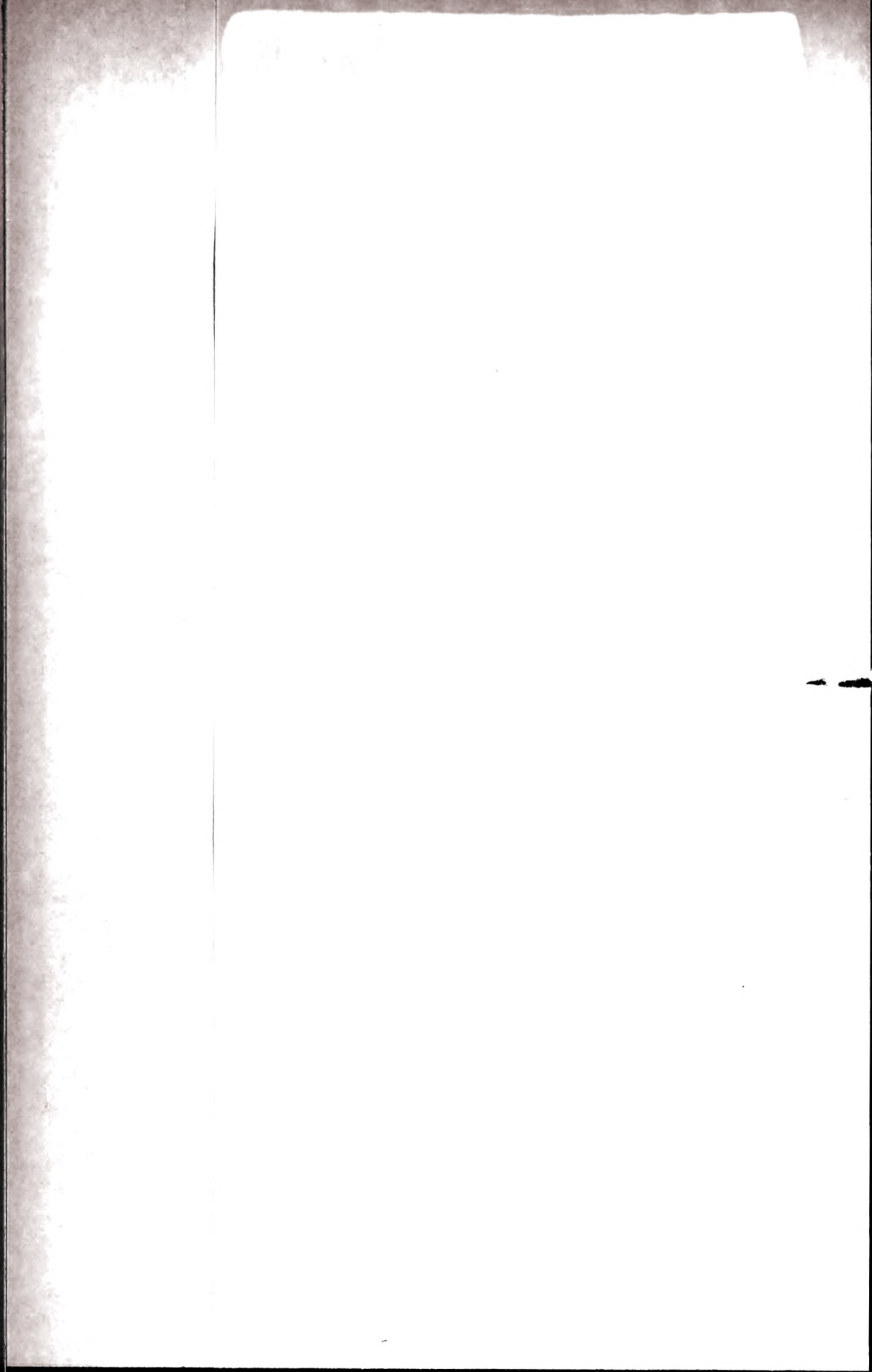
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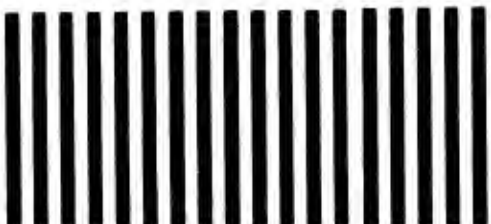








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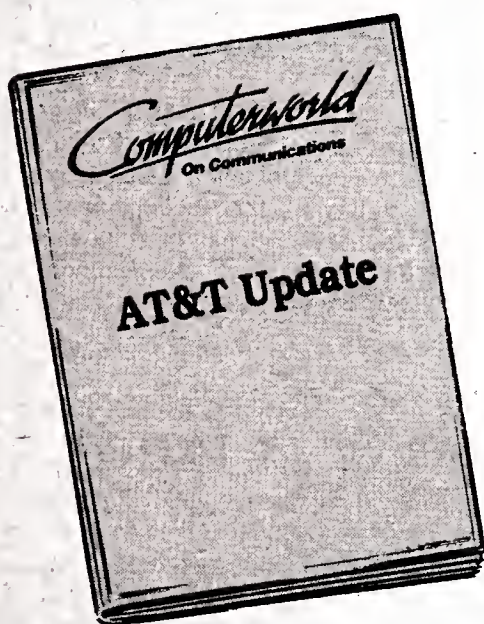


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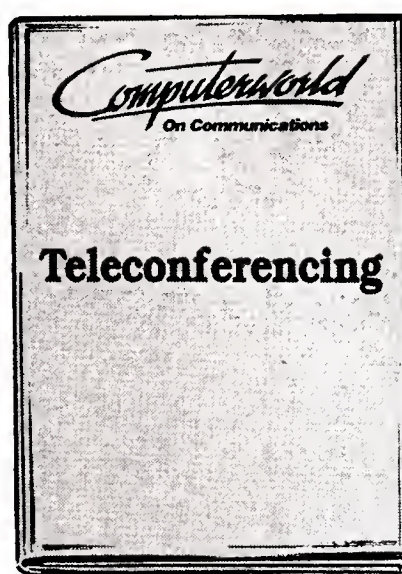
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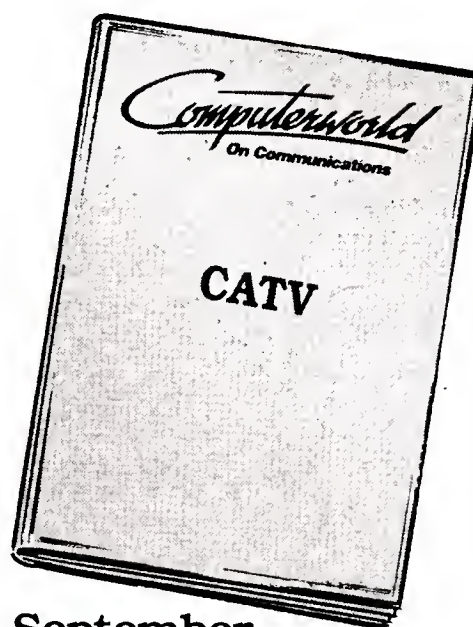
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## COMPUTER INDUSTRY



## SUPERSHORTS

**Western Digitech** has opened a combined maintenance and disaster recovery service facility in San Jose, Calif., to support users of Digital Equipment Corp. PDP-11 and VAX computer systems.

**American Microsystems, Inc.** and **International Microelectronic Products, Inc.** announced the settlement of a lawsuit by the execution of a cross license under certain pending patent applications owned by each party.

**Manufacturing & Consulting Services, Inc. (MCS)** announced its intent to work with **Hewlett-Packard Co.** to provide mechanical engineering software and design support for

the HP 9000 line of engineering computers. HP is also negotiating to purchase a minority equity interest in MCS. MCS founder and president, Dr. Patrick J. Hanratty, said if negotiations are successful MCS and HP would work together to develop and market integrated hardware and software products for the engineering market.

**BSR International** and **Acorn Computers** announced an agreement to establish a joint venture company in Hong Kong under the name of Optical Information Systems, Ltd. Optical has been established to develop new digital, optical technology for computer data storage as well as retrieval.

**Integrated Device Technology, Inc.** announced plans to expand and relocate the company's static random-access memory division to its newly acquired property in Salinas

Valley, Calif. Site plans include the development of a complex housing two large, wafer fabrication facilities.

**Ungermann-Bass, Inc.** announced it has signed a third-party maintenance agreement with **RCA Service Co.**, a division of RCA Corp. The agreement provides service to Ungermann-Bass customers nationwide with a guarantee of a four-hour response.

**Zilog, Inc. Systems Division** is now licensing its Unix operating system source code for the Z8000 microprocessor independently of the System 8000 supermicro computer for which it was originally developed.

**Westlake Service Center** announced the opening of a data processing center in the Conejo Valley, Calif., area. The 33,000-sq-ft facility houses an IBM computer, the IBM 3084 and additional IBM and Bur-

roughs Corp. computers and peripheral equipment.

**The United States Telephone Association** has accepted the former Bell system companies as members and expanded its board of directors accordingly. In this action, the board ended an 87-year-old tradition against Bell system participation.

**Pansophic Systems, Inc.** announced the acquisition of the marketing rights to **VMLIB**, a source library system for CMS, which operates in a native or guest system control program environment, from VM Software, Inc.

**David Y. Peyton** has joined **Information Industry Association** as director of government relations. Peyton will concentrate his efforts in the areas of proprietary rights, videotex and government competition with private sector firms.

## Hogan reports revenues boost

DALLAS — **Hogan Systems, Inc.** recently reported net income of \$4.6 million, or 36 cents a share, for its fiscal fourth quarter, compared with net income of \$1.1 million, or 10 cents a share, a year earlier.

The company reported revenues of \$16.4 million for the quarter, compared with revenues of \$5 million a year earlier.

**Richard Streller**, president of the software company, said the increased revenues and earnings were mainly attributable to sales to financial institutions.

Streller said the company had revenues of nearly \$6 million for backlog orders of its loan processing system, which was delivered in February after three years of development.

## Glenn to speak at trade show

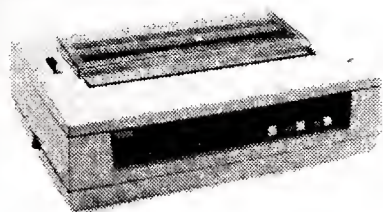
DALLAS — U.S. Sen. John Glenn (D-Ohio) is scheduled to speak to the National Office Machine Dealers Association in the Dallas Convention Center on July 14.

The National Trade Association for Business Equipment and Systems Dealers will be conducting its annual convention and trade show from July 11-14.

Advance registration costs \$145 for members and \$175 for nonmembers. Admission to the show will be \$155 for members and \$185 for nonmembers.

More information is available through the Convention Department, National Office Machine Dealers Association, 810 Lively Blvd., Wood Dale, Ill. 60191.

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inc. service \*

\* 1 year lease

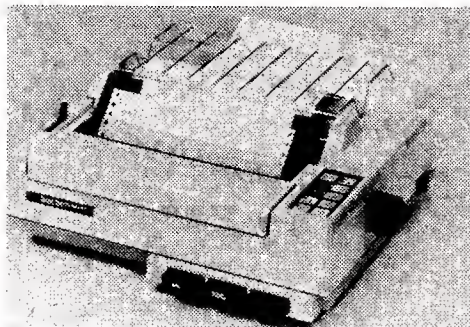
- 100 cps draft-quality mode.
- 50 cps memo-quality mode.
- Full bit map graphics.
- Delivers up to 3 copies.



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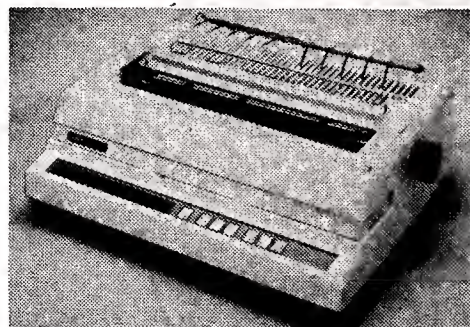
- 150 cps draft-quality mode.
- 35 cps letter-quality mode.
- Selectable fonts, raster graphics.
- Delivers up to 3 copies.



In New Jersey:

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## PC Printers



Diablo

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\* 1 year lease

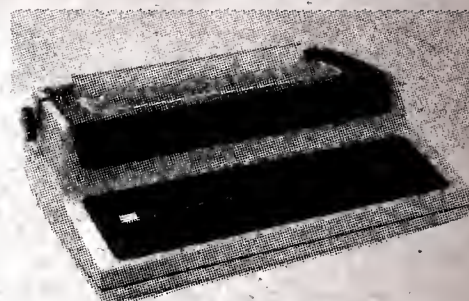
- 40 cps letter-quality printer.
- Fully-formed characters.
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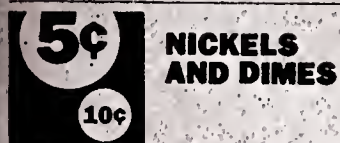
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## COMPUTER INDUSTRY



**Data I/O Corp.** reported profits for the quarter ended March 31 were \$1.9 million, or 23 cents per share, compared with \$797,000, or 11 cents per share, in the comparable quarter of 1983. Revenues were \$9.7 million, compared with \$7.6 million one year ago.

**Planning Research Corp.** reported profits for the third quarter were \$2.3 million, or 33 cents per share, compared with \$2.2 million, or 32 cents per share, in 1983. Revenues were \$79.4 million, compared with \$81.2 million in 1983.

**Applied Communications, Inc.** reported profits for the second quarter ended March 31 were \$673,501, or 17 cents per share, compared with \$517,310, or 19 cents per share, in 1983. Revenues were \$5.8 million, up 45% from \$4 million in 1983.

**Computer Task Group, Inc.** announced revenues for the first quarter ended March 31 were \$17.3 million, a 54% increase from 1983. Profits were \$337,000, or 17 cents per share, compared with \$297,000, or 16 cents per share, in 1983.

**Emulex Corp.** announced profits for the third quarter of \$3 million, or 23 cents per share, compared with \$1.8 million, or 14 cents per share, a year earlier. Revenues increased 122% to \$21.3 million from \$9.5 million in 1983.

**Phoenix American, Inc.**, a company that sponsors leasing partnerships, recently reported third-quarter profits of \$2.08 million, up from \$1.7 million one year ago. Third-quarter revenues were \$8.4 million, up 19% from the previous year.

**Computer Entry Systems Corp.** reported profits for the first quarter ended March 31 of \$193,000, or 5 cents per share, compared with \$115,000, or 3 cents per share, in 1983. Revenues were \$5.5 million compared with \$3 million in 1983.

**Science Management Corp.** reported a net loss in profits for the first quarter ended March 31 of \$1 million, or 39 cents per share, against a loss of \$598,000, or 31 cents per share, in 1983. Revenues were \$18.5 million compared with \$13.5 million in 1983.

**Data-Design Laboratories** announced profits for the third quarter ended March 31 of \$1.5 million, or 33 cents per share, compared with \$1.1 million, or 26 cents per share, in 1983. Revenues were \$24.8 million, up from \$20.4 million in 1983.

**Technicon International, Inc.** announced a net loss in profits for the first quarter ended March 31 of \$276,000, or 1 cent per share, compared with a profit of \$1.1 million, or 6 cents per share, in 1983. Revenues were \$48.3 million compared with \$25.6 million in 1983.

**Hybritech, Inc.** reported profits for the first quarter ended March 31 of \$138,075, or 1 cent per share, com-

See NICKELS page 121

## REGION from page 101

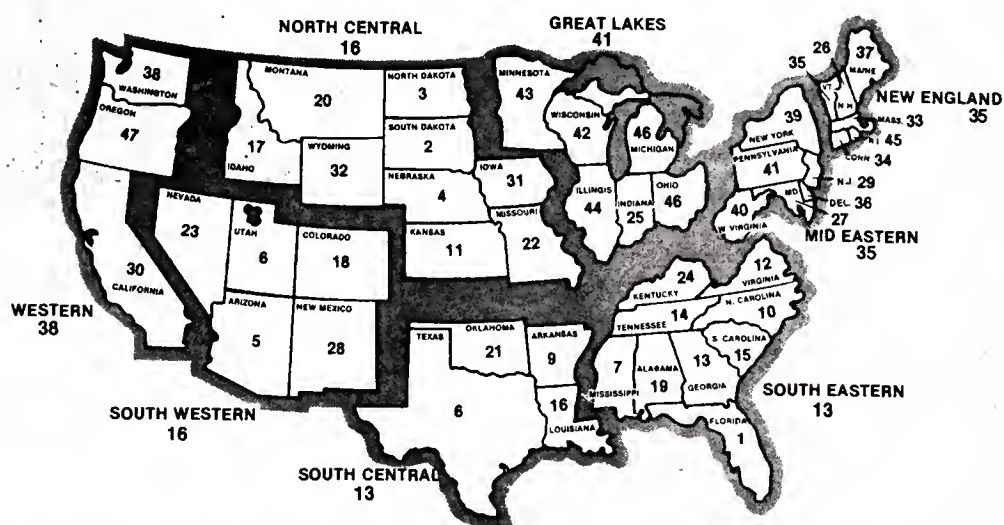
(South Dakota), third (North Dakota) and fourth (Nebraska) are located in the northern plains, indicating a much friendlier environment for manufacturers than the Frost-Belt reputation would lead people to believe, according to the study's authors.

States that managed their fiscal affairs without burdensome new state and local taxes were the states that ranked well, according to Price. The manufacturers' associations that weighted the categories selected "state and local government fiscal policies" as the most important factor.

Copies of the study cost \$20 from Alexander Grant & Co., 3900 Prudential Plaza, Chicago, Ill. 60601.

## 1983 MANUFACTURING BUSINESS CLIMATES STUDY

State Ranks and Regional Averages



Key: Number within the state is its overall rank based on 22 factors affecting manufacturing business climates. Number below the regional name is the average rank of states within the region.

Alexander Grant & Co. chart

Both letter-quality and draft hard copy

Fastest document throughput in its class

Both friction and tractor paper feed

Better, more versatile operator controls

Better, more durable easy-access font modules

Compatibility with third-party and proprietary software

TI reliability

Industry standard serial and parallel interfaces.

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**Two Printers In One.** With the TI 855 you get the speed of dot matrix draft copy. Plus the precise clarity of the most advanced matrix technology for letter-quality print. It's two printers in one — at one low price.

**A Great Family Name.** Texas Instruments is known for providing the world with the industry standard for printers — the TI 810. TI builds the same reliability into every 800 series microprinter. Both the 855 and the data processing Model 850 are part of the expanding TI line of high-performance, low-cost microprinters.

**Hardware Compatible.** The TI 855 microprinter is compatible with all major PC hardware. And it provides both serial RS232C subset and "Centronics-type" parallel as standard interfaces.

**Software Compatible.** The TI 855 uses industry standard escape sequences for compatibility with virtually all third-party software. And for those with proprietary software needs, a model is available with ANSI standard escape sequences.

**Tough Font Modules For Quick Character Change.** Three font modules can be inserted into the front of the printer at one time, and are accessed individually. Each contains both draft- and letter-quality character sets. They're easier to use, more reliable and more durable than traditional metal or plastic daisy wheels.

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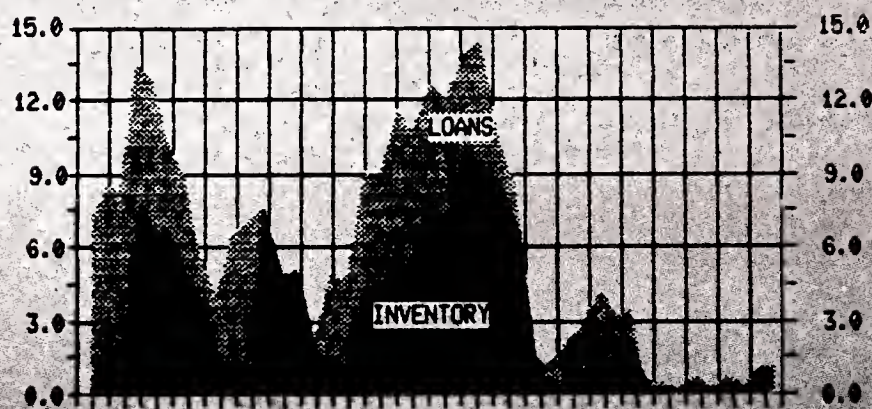
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digital



## COMPUTER INDUSTRY

**NICKELS** from page 119

pared with a loss of \$573,772, or 22 cents per share, in 1983. Revenues were \$6 million, compared with \$3 million in 1983.

**Centronics Data Computer Corp.** reported revenues for its first quarter of \$39.5 million, compared with \$43.7 million a year ago. Net loss for the quarter was \$1.9 million, or 17 cents per share, compared with a profit of \$204,000, or 2 cents per share, in 1983.

**Timeplex, Inc.** announced that profits for the third quarter ended March 31 were \$1.5 million, or 19 cents per share, compared with \$1 million, or 12 cents per share, a year earlier. Revenues were \$17.7 million, a 57% increase from \$11.2 million in 1983.

**Communications Corp. of America** announced a net loss for the third quarter ended March 31 of \$1.6 million, or 39 cents per share, on revenues of \$15.6 million, compared with a net loss of \$824,049, or 19 cents per share, on revenues of \$11.7 million in 1983.

**Computer Sciences Corp.** reported profits for its fourth quarter were \$7.1 million, or 51 cents per share, compared with \$4.6 million, or 34 cents per share, in 1983. Revenues were \$185 million, compared with \$91.7 million in 1983.

**COLUMN** from page 101

The Computer and Business Equipment Manufacturers Association (Cbema) recently came out with some nice things to say about the Republican agenda for technological leadership and industrial competitiveness.

**Consistent with Cbema's plan**

Cbema President Vico E. Henriques said the organization hasn't endorsed the Republican plan, but "it is highly consistent with many of our own proposals," such as altering antitrust laws to support joint research, continuing R&D tax credits and so on.

Noting that some Democrats are also interested in fostering high-tech growth, Henriques said, "We are eager to work with members of both parties toward economic expansion."

The European Economic Community (EEC) Commission recently announced that IBM's "selective distribution" of personal computers in Europe does not violate the EEC's antitrust policy.

**Supplies authorized dealers**

IBM, according to EEC spokesmen, complements its own sales force and retail outlets by supplying equipment only to authorized dealers who meet published criteria and prohibits those dealers from selling to unauthorized dealers.

The EEC Commission found that criteria for appointment as an IBM dealer are objective, relate to the qualifications of applicants and suitability of premises and are uniformly applied without discrimination.

An article of the treaty which established the EEC prohibits agreements or practices that restrict competition.

**TAX** from page 101

right and the other is absolutely wrong."

Under California statutes, packaged software that a developer sells off the shelf is indisputably subject to state sales tax. But on the question of custom programs, the law for years remained ambiguous and confusing.

Until about 18 months ago, the only part of the state legal code that applied even vaguely to custom-software taxation was a general statement that tangible property is taxable while services are exempt. Left unanswered was the crucial question of whether custom programs qualify as property or services.

In an apparent bid to clarify matters, the board in 1972 drafted Cali-

fornia Tax Regulation 1502, which defined custom software as tangible property and thus made it fair game for sales taxes.

Citing the regulation as its legal authority, the board then audited General Business Systems, pronounced the Sunnyvale, Calif.-based firm delinquent in its tax payments and hit the vendor with a \$50,000 assessment. Although it protested loudly, the firm eventually bowed to the board's demands and paid the required penalty.

But about four years ago, General Business Systems took its grievance to the California Superior Court and demanded a full refund on the grounds that Regulation 1502 is unconstitutional, according to the firm's attorney, Al Eagle.

Arguing that custom software is a

service and, therefore, exempt from sales taxes, the company eventually won its case. The board later appealed.

In the meantime, members of the California legislature introduced and enacted a bill that for the first time explicitly addressed the issues raised in the General Business Systems case. Assembly Bill 2932 was signed into law in September 1982 by then-Gov. Jerry Brown.

In essence, A.B. 2932 declares custom software to be a service rather than tangible property and thus exempt from state sales tax. But although the new law appears to uphold General Business Systems' viewpoint and invalidate Regulation 1502, the company's running legal battle with California tax authorities rages unabated.



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Operating system programmer analyst to maintain and improve large scale computer operating systems in PWB/ENG Computer Center. Must have operating system support experience in DEC VMS or UNIX/PWB. Requires BS in CS.

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**OS/VS Systems Software Developer** will develop and maintain the SAS supervisor and related components for the IBM OS/VS and MVS/XA environments. Use of IBM 370 Assembler as a programming language and exposure to OS/VS supervisor and data management macros are required. Experience with the development and support of large software systems and the use of IBM service aids is desirable. Familiarity with operating system concepts, compiler design and implementation, PL/I, and the SAS System are significant assets. A bachelor's degree, preferably in computer science, or the equivalent is required.

**Development Support Programmer** will design tools for internal software development and assume responsibility for integration of development libraries. Experience with OS/MVS, TSO, JCL, the SAS System, and either PL/I or IBM 370 Assembler is preferred. A bachelor's degree in computer science or the equivalent is required. Knowledge of VM/CMS, DOS/VSE, minicomputer systems, or microcomputer systems is a plus.

**Compiler Systems Developer** will assist in the development of a PL/I-like compiler. Applicants must have a BS degree in computer science or mathematics with a strong background in block structured languages, preferably in PL/I. Experience with complex systems software design and implementation is required. Familiarity with Assembly languages, particularly IBM 370 Assembler, and compiler and code generation issues is a significant asset.

**VAX/VMS Systems Programmer** will assist in development of host routines and SAS interface routines for Digital VAX systems. Applicants must have at least one year of experience with VMS and Macro-11. PL/I programming experience is a significant asset.

**Minicomputer Programmer** will develop the SAS System for various minicomputers. The individual will write and maintain code and documentation, transport code, prepare master tapes, and educate users. A BS degree, preferably in computer science, is required. Minicomputer

experience, knowledge of the SAS System, and Assembler language experience are preferred.

**Testing & Documentation Developer** will work on several minicomputers to develop and maintain test and benchmarking programs for the SAS System. This person will aid in developing internal and external documentation for the system. Applicants must have one to two years' programming experience on minicomputers. Working knowledge of PL/I and the SAS System is desirable. A BS degree or the equivalent is required.

**Microcomputer Software Developer** will design and develop software for microcomputers. Applicants must have in-depth knowledge of 8086 Assembler language, C language, and IBM PC-DOS BIOS. A bachelor's degree in computer science or equivalent experience is required. Experience with full-screen and graphics drivers is highly desirable. Applicants must provide samples of related work experience.

**Graphics Programmer** will work with PL/I, TSO, 3270 full screen I/O, and new business graphics hardware. Responsibilities include writing new graphics programs, and maintaining and enhancing existing programs. Applicants must have a BS in computer science or the equivalent, and one year of work experience. Experience and a strong interest in graphics are required.

**Graphics Programmer** will transport, convert, verify, and maintain existing graphics code on various machines and operating systems, including TSO, VM/CMS, DOS/VSE, AOS/VS, VMS, and PRIMOS. Applicants must have a BS in computer science or the equivalent and a strong background in TSO, VM/CMS, or DOS/VSE and AOS/VS, VMS, or PRIMOS.

**Technical Support Representatives** will specialize in a particular area of expertise relating to the SAS System. The Technical Support Department supports SAS users in areas ranging from syntax specification and documentation interpretation to software problem investigation and new product testing. Primary responsibilities include the support of software installation,

operating system dependent procedures, file access methods, and quality assurance testing of new releases and products. Applicants must have a minimum of two years' SAS programming experience in the VM/SP or OS/MVS operating environment, and experience in resolving system related error conditions at the application programming level. DOS/VSE experience is a significant asset. A bachelor's degree is required. Technical support experience is preferred.

**Senior Technical Support Representative (IBM MVS)** will diagnose problems at the SAS supervisor/operating system interface level, prepare and test software patches, and provide technical assistance to other representatives. Working knowledge of machine code, architecture, and system utilities is required. Applicants must have programming experience in IBM Assembler and in-depth knowledge of MVS system macros, diagnostic aids, and memory management. Excellent verbal communication skills and a BS, preferably in computer science, are required.

**Senior Technical Support Representative (DEC VMS)** will diagnose problems at the SAS supervisor/operating system interface level, prepare and test software patches, and provide technical assistance to other representatives. Programming experience in PL/I and VAX MACRO-32 languages and working knowledge of machine code, architecture, and system utilities are required. Applicants must have a BS degree, preferably in computer science, and excellent verbal communication skills.

**Quality Assurance Analyst** will work with various Institute departments to test the SAS System. Specific responsibilities include development and maintenance of systems for tracking software through development, testing, and release; development of testing tools; documentation and testing of SAS procedures; and coordination of product testing. Applicants must have knowledge of the SAS System, extensive knowledge and experience with an operating system, willingness to work with other operating systems, and good written and verbal communication skills. A quantitative degree is required.

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Min. educ., training and exp. require. are: (1) a knowl. of programming struct. and logic, digital and analog electronic theory and prin., computer systems and operations, basic data comm. theory, microcomputer systems using Assembler lang., IDOS, electronic data teleprocessing, SNA/SDLC data trans. systems, asynch. systems and a broad exposure to a variety of program. lang.; typically obtained by a B.S. degree in Computer Science, or by a min. of three (3) years of rel. exp. w/ a microprocessor-based data term. system for on-line processing of cust. trans. and admin. functions for financ. institutions or comparable system; & (2) demonstrated ability in macro-Assembler programming of microprocessor based computer systems typically obtained by a min. of three (3) months exp. programming such systems.

Salary: \$23,600/yr. interested Individuals should apply to Nancy Thompson, Minn. Dept. of Econ. Security, Control #4-24, 309 2nd Ave. South, Minneapolis, MN 55401.

We are an affirmative action employer.

## ADMINISTRATIVE COMPUTING MANAGER

Immediate and challenging opportunity in a growing computer environment for a Manager of the Administrative Computing Group at the University of Nebraska Medical Center. Individual will be responsible for planning and coordinating administrative computing and office automation functions. These functions include support of university-wide systems on the campus with an IBM mainframe and campus-based on line system running on a Data General. Office automation systems include support on mainframe and microcomputers. Must have ability to work with all levels of management and communicate in clear and concise manner. Must have proven ability to manage personnel, formulate and implement plans and ideas. Bachelor's degree required in business, computer science, industrial/management engineering or other related field. Minimum 5 to 7 years experience in computing environment with demonstrated management capabilities required. Advanced degree is desirable. Qualified applicants may send resume to:

Department of Human Resources  
**UNIVERSITY  
OF NEBRASKA  
MEDICAL CENTER**  
619 S. 42nd Street  
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## PROGRAMMERS/ SOFTWARE SUPPORT

Continued growth of our company and Informations Systems Dept. has created an immediate need for two qualified professionals.

The successful candidate will have 2-4 years progressive experience installing, maintaining and supporting applications software. Strong Cobol skills and a thorough knowledge of DOS/VSE JCL is also required. Current experience with VM/CMS, ISPF, CICS and UCC or MSA software would also be a plus.

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**CROFT**

## COMPUTER MAINTENANCE ENGINEER

with Michigan firm. 3 plus years experience with DEC/VAX 11-780 computers, electrostatic plotting systems and 300 array processors. Electronic/electrical engineering degree and supervisory experience helpful. Attractive salary and benefit package. Relocation paid. Send resume and salary history to: Personnel Planners Inc., 123 East Broadway, Mount Pleasant, MI 48858.

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Box 299  
Medford, Oregon 97501



## SYSTEMS ANALYST

We are seeking a bright and responsible person with 4-7 years FORTRAN, PASCAL and/or COBOL experience to be part of our exciting and dynamic organization. Individuals with experience in database management systems and VAX VMS or RSX 11M a plus.

Consolidated Group, Inc. is a nationally known and respected administrator of group insurance programs for small employers.

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Please send your resume to Joan Goldfracht, Personnel Administrator.

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## ASSOCIATE DIRECTOR ACADEMIC SUPPORT

The University Center at Binghamton, State University of New York, seeks a qualified person in the support of academic computing effective July, 1984.

The associate director for academic support reports to the Director of the Computer Center, participates in policy and planning decisions and supervises a staff of ten professionals, four graduate students and undergraduate consultants. The position also includes responsibility for campus instructional and research computing activities.

The associate director assists in the selection of equipment and service strategies to meet faculty computing needs, organizes and participates in Computer Center workshops, supervises installation of software packages, and coordinates general user consulting and documentation. Other areas of responsibility include defining specifications for new equipment, statistical computing support, word processing support, academic software support and operation of campus micro computer and terminal facilities. The associate director also participates in several on-campus computing committees and statewide organizations for academic computing.

Candidates should have an understanding of computing needs of faculty and students, a strong technical background with demonstrated management and communications abilities. A masters degree and three to five years' experience in university computer center are desirable qualifications. Two years of experience should include academic computing at the management level.

Located in scenic upstate New York, the University Center at Binghamton enrolls approximately 11,700 students in undergraduate and graduate programs. In addition to Harpur College, the School of Arts and Sciences, there are professional schools in Nursing, Management, General Studies and Professional Education, and the Watson School of Engineering, Applied Science and Technology. Computing facilities include a NAS AS/6, two VAX 11/780's, one VAX 11/750, and an extensive communications network connecting on-campus terminals and micros as well as other upstate SUNY units.

The University offers an excellent benefit package. Submit resume, along with names of three references, by June 15, 1984, to Geraldine MacDonald, Director, Computer Center, SUNY-Binghamton, Binghamton, NY 13901. Equal Opportunity/Affirmative Action Employer.



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Ortho Diagnostic Systems, Inc., a Johnson & Johnson Company in Central New Jersey, seeks an individual to join our Information Services Group.


SENIOR SYSTEMS ENGINEER

REQUIREMENTS:

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- Three (3) years direct experience in the design, evaluation, test, upgrade & trouble shooting of software systems.
- Installed DOS/VSE, CICS systems.
- Thorough knowledge of Assembler (BAL), ANS COBOL language.
- Excellent communication skills.

Ortho Diagnostic Systems provides an exceptional potential for career growth and a generous company paid benefits package including tuition reimbursement and dental plan.

Qualified candidates are encouraged to send their resume and salary history to: Employment Office, CW



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ANALYST/ PROGRAMMER III

Juneau, Alaska

The State of Alaska needs an Analyst/ Programmer who can evaluate, modify, design and debug data processing programs and work on data base applications being developed for the Department of Transportation and Public Facilities.

Minimum qualifications include one year experience as an Analyst/Programmer II with the State of Alaska or equivalent elsewhere.

The Analyst/Programmer II level is the advanced training level of the Analyst/ Programmer series. Positions at this level write routine programs and learn advanced program design.

Salary \$2,757 per month. Please send resume and inquiries to: Recruitment Coordinator, State of Alaska, Pouch C-0201, Juneau, AK 99811. THE STATE OF ALASKA IS AN EQUAL OPPORTUNITY EMPLOYER. WOMEN AND MINORITIES ARE ENCOURAGED TO APPLY.

STATE OF ALASKA

ALASKA

DATA BASE ADMINISTRATOR

University of Alaska

The University of Alaska is in the process of upgrading its computing services. We anticipate making our final decision for the hardware, application and data base management software by May 31, 1984. If you are experienced in data base software and management we want to hear from you. The successful candidate must provide technical competence in the implementation and maintenance of a data base system; provide standards and establish data base(s) systems for the University of Alaska; train and assist users of the system throughout the state; ensure the integrity and security of the system; assist the analyst/programming staff in developing integrated systems utilizing data base techniques. Extensive experience in data base administration is required. Minimum annual salary is \$46,488.

This position will reside at the Fairbanks campus which is the state's primary residential institution. Fairbanks, located in the interior of Alaska, offers a variety of historical, cultural and year round activities. The spirit of adventure is still alive in Alaska.

Interested individuals should submit a cover letter, resume and three references to:

Statewide Office Human Resource Development  
Room 1, Bunnell Building  
University of Alaska  
303 Tanana Drive  
Fairbanks, Alaska 99701

Closing date: June 1, 1984 (postmarked by June 2, 1984)

Your application for employment with the University of Alaska may be subject to public disclosure should you be among the finalists for the position. The University of Alaska is an Equal Employment/ Affirmative Action Employer and Educational Institution.



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Programmer/Analyst needed to design, develop, test, and integrate software for telephone facilities management systems. Analyze business procedures and problems to refine data and to convert it to programmable form for electronic data processing. Study existing data handling systems to evaluate effectiveness and develop new systems to improve workflow as required. Requires a Bachelor of Science in Computer Science and 1 year experience in job offered or 1 year in related software development experience or will consider a combination of 6 months additional academic course work and 6 months experience in lieu of 1 year experience. Must have software development experience in Data General (AOS) and Prime (PRIMOS) computers. Must have knowledge of COBOL, FORTRAN and PASCAL programming languages. Must also have experience with accounts receivables, payables, general ledger and order entry as applied to telephone facilities management systems. 40 hour work week. \$23,000 per year. Apply at the Texas Employment Commission, Dallas, TX. TEC Job Order #3384870. Ad paid by an Equal Employment Opportunity Employer.

### IBM SYSTEM/38 PROGRAMMER

Come to the San Francisco area and work for a dynamic, growing software company. We have created some of the most advanced utility products for the S/38. And even greater products are on the way! Become part of the excitement.

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### SYSTEMS ANALYST FAIRBANKS NORTH STAR BOROUGH SALARY: DOE

CLOSING DATE: 6/8/84

The incumbent will be responsible for analyzing, designing, program testing and documenting new systems development and subsequent maintenance. Applicants must have two to three years experience in COBOL programming on IBM 4300/370 involving a business environment, plus two to four years computer work at the college level or technical training. Must be familiar with CICS, DOS JCL, and have experience in any of the following: school systems, payroll, accounting. Project management experience very helpful. Interested applicants should submit resumes to the Fairbanks North Star Borough, Human Resources Division P.O. Box 1267, Fairbanks, Alaska 99707. Telephone (907) 452-4761 ext. 203.

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- MVS, VM, DOS/VSE and/or VS1 preferred
- UNIX "C" or PASCAL on microcomputers—IBM PC preferred.

ADR offers a comprehensive benefits package, liberal relocation assistance and compensation fully commensurate with your experience. For consideration, please forward your resume or call **Gary Johnson, (201) 874-9000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.**



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**ITHACA COLLEGE  
DIRECTOR OF ACADEMIC  
COMPUTING SERVICES**

Ithaca College is seeking applicants to direct the activities of staff members responsible for providing instructional and research computing support for the college community. Ithaca College operates a network composed of a Sperry 1100/81, 3 VAX 750's and over 100 terminals and microcomputers. Access to these computing facilities is provided through a communications network which links all computers on campus to terminals located in both central and remote facilities.

The Director of Academic Computing Services directs the systems programming, communications, operations, and maintenance activities associated with instructional computing support. Individuals interested in the position should hold a master's degree in computer science or a closely related field and have 3-5 years experience in an academic environment. Considerable management experience and excellent interpersonal skills will be required to effectively serve the diverse user community and comprehensive technical capabilities will be necessary to cope with the multi-vendor communications and computing facilities. Salary commensurate with experience.

Ithaca College is the largest private residential college in New York State with approximately 5,000 students and 450 faculty. Ithaca offers 70 degree programs in traditional and professional disciplines through six schools - Allied Health Professions; Business; Communications; Humanities and Sciences; Music; and Health, Physical Education and Recreation. The College is located in Ithaca, New York, the heart of the scenic Finger Lakes region.

Letters of application, resumes and lists of references should be sent by June 8, 1984 to:

**E. Graham Pillow  
Director, Systems and  
Data Processing  
Ithaca College  
Ithaca, NY 14850**

*Ithaca College is an equal opportunity/  
affirmative action employer*

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| Electronic Warfare Software Engr (2 yrs)          | 25-40K |
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| ACP/PARS Prog/Anal, Sys Anal (2 yrs ACP/PARS)     | 26-40K |
| Bank Prog/Anal (2 yrs Bank Apps, IBM 370 or 8000) | 20-29K |
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| Insurance Prog/Anal (2 yrs MVS, CICS)             | 21-28K |
| Prog/Anal (2 yrs UNI 1100, DMS 1100)              | 23-32K |
| Prog/Anal (2 yrs IMS, CICS or IDMS)               | 25-35K |
| Prog/Anal (2 yrs HONEY 66, IDS II, DM IV-TP)      | 25-34K |
| Prog/Anal (2 yrs HP 3000)                         | 25-30K |
| Sys Anal (3 yrs IMS, CICS or IDMS)                | 28-39K |
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| Sys Prog (2 yrs IMS, CICS or IDMS)                | 27-40K |
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| DEC Sys Prog (2 yrs PDP II or VAX)                | 25-40K |
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| Software Engr (2 yrs Z80, 8080, 8080)             | 25-40K |
| Software Engr (2 yrs UNIX, "C")                   | 25-35K |
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| Data Base Anal (2 yrs IMS)                        | 35-45K |

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**Personnel Services  
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**University of Illinois  
Associate Vice President for  
Administrative Information Systems and Services**

Applications and nominations are invited for the position of Associate Vice President for Administrative Information Systems and Services.

The University is a Land-Grant institution serving 60,000 students on two major comprehensive campuses in Urbana-Champaign and Chicago, including a major health sciences center and teaching hospital. The University operates with an annual budget in excess of \$900 million.

The Associate Vice President serves as the senior officer responsible for the planning and delivery of information systems and data processing services which support the administrative operations of the University. Reporting to the Vice President for Business and Finance, the Associate Vice President advises the University's General Officers on information systems policies and procedures.

Candidates should possess a four-year college degree with at least five years of management level experience, with information systems management desirable. Preference will be given to candidates who possess excellent communications skills and have proven management and leadership qualities in a large, complex organization.

Machine environment includes (2) 3081D's, (1) V8, (1) 4341 Group 2 operating under MVS/SP. Network environment consists of 35-40 RJE stations and 1800 terminals.

Salary: Negotiable. Appointment date: Approximately August 15, 1984.

In order to assure full consideration, applications or nominations, including a current resume and a list of references, should be forwarded by June 15, 1984 to:

**Ms. Mary E. Beastall  
University of Illinois  
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## RCA Systems Development

RCA Service Company is under contract to design, develop, and maintain state-of-the-art data acquisition, real-time tracking and interactive display, and data reduction systems driven by SEL 32/87, 32/77 and INTEL 8086 computers.

Due to the increased commitments of a recently renewed, long-term contract, we are currently augmenting the Systems Development Group with the following unique and challenging positions located at the Development Site in NEWPORT, RHODE ISLAND and at the Operations Site in the BAHAMAS.

### Senior Analyst

Analyze the performance of complex real-time tracking algorithms with respect to accuracy, stability and efficiency. Working with other senior scientists, formulate, develop and test potential improvements/extensions. Analyze data associated with anomalous algorithm output and make corrections. Requires strong analytical ability, familiarity with math modeling, hydroacoustic principles, matrix calculus and structured FORTRAN as well as strong oral and written communications. A Bachelor of Science Degree and 5 or more years applicable experience. (Newport Position).

### Systems/Diagnostics Programmer

Experience on SEL Concept 32 Systems under MPX 2.1-A and/or MPX 3.2 as well as troubleshooting of systems level hardware/software problems and operating systems maintenance. Requires experience in Gould/SEL Assembly language, diagnostics, and MPX internals. Degree preferred and FORTRAN applications are a plus. (Bahamas Position).

### Applications Programmer/Analysts

Assignments include error modeling, design, development and documentation of real-time and off-line software in FORTRAN 77. Requires BS degree in Software Engineering/Computer Science, or Math with strong CS, and 0-5 years experience. (Bahamas and Newport Positions).

This project offers an opportunity to grow with the technology, utilizing contemporary and frequently innovative methodologies as well as small company atmosphere with big company benefits. Assignments in the Bahamas receive bonus pay, attractive tax advantages, and subsidized or free housing and meals. All positions require US Citizenship and occasional travel. Qualified applicants are encouraged to mail resume, including salary requirements to:

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### SYSTEMS PROGRAMMER

The City of Corpus Christi is seeking qualified applicants for the position of Systems Programmer. Requires bachelor's degree in computer sciences or related field with minimum of 3 years experience in data processing, systems design, and programming including 1 year experience supporting operating systems software; or any equivalent combination of training and experience. Our data processing department utilizes a large teleprocessing network which operates under IBM software (MVS/CICS) using IBM 3083 Model E central processing unit. We offer a comprehensive benefits program and salary commensurate with experience and qualifications. Call or send resume to:

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Personnel Department  
110 North Shoreline  
Corpus Christi, TX 78401  
(512) 884-6172

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### COMPUTER SCIENCE INSTRUCTOR

Horry-Georgetown Technical College is seeking an individual to teach computer technology courses to include RPG II, COBOL, JCL, BASIC, etc. in the Computer Science/Data Processing curriculum. Applicants must possess a master's degree in Computer Science or a bachelor's degree in Computer Science plus 3 years work and/or teaching experience. Horry-Georgetown Technical College is a 2 year community/technical education institution which is located near Myrtle Beach, South Carolina. The college is accredited by the Southern Association of Colleges and Schools. Salary commensurate with education and experience. Position available September 1, 1984. Submit resume and transcripts to:

Personnel Office  
Horry-Georgetown Technical College  
P.O. Box 1966  
Conway, SC 29526

EOE. Closing date for applications/resumes is June 15, 1984.

### CAREER OPPORTUNITY FOR A SENIOR PROGRAMMER/ANALYST:

Deschutes County, Bend, Oregon, located at the base of the Cascade Mountains in central Oregon, is a paradise for all recreational activities. The County is searching for a Senior Programmer/Analyst with extensive PICK experience. QUALIFICATIONS: 5 years experience with the PICK system including data base, PROC, ENGLISH, or RECALL, or INFORMATION. Complete understanding of the PICK operating system, file and data structures and their interrelationships. Background should include analysis, design, implementation, training, programming, supervisory and PICK assembly. Send resume and salary requirements to:

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We are seeking a Sr. Systems Programmer to support VM/SP and related software. If you have a minimum of 4 years VM systems programming experience, including installation, maintenance, VM internals, and strong diagnostic skills, plus experience in Assembler language coding, you may qualify for this position.

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Requires 2-4 years C.P.E. experience including performance management, monitoring, configuration analysis, application analysis and operating system changes. Working knowledge of SAS, Assembler and OS/MVS system internals required.

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Requires a minimum of three years IMS systems programming experience with knowledge of IMS DB/DC internals, SMP, and strong diagnostic skills. Project leadership skills and interest a must.

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Apply your expertise in MVS/NCP/SNA to maintain VTAM in our multisystem MVS/SNA environment. BSCS and 4 years directly related

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Take charge of Amdahl's worldwide data networks, including satellite communications, SNA/SDLC, X.25, Codex and Amdahl Network hardware. You'll interface with vendors, corporate management, and both U.S. and European user groups. BSCS or equivalent preferred; 6-10 years experience in network operations required, with at least 2 years managing a large data network.

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Take part in the design, development and testing of 580 Macrocode, and be responsible for existing XA/IO emulation code and related I/O supervisor code for CAF enhancements. BSCS or equivalent required, with 5+ years experience with IBM 370 architecture, assembly language and complete knowledge of 370 and XA mode I/O and MVS.

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Participate in the design, development and testing of 580 Macrocode; assume responsibility for existing code for 370 and XA mode recovery;

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Design and support development of Macrocode for the Amdahl 580 and future processors. You must have a BS/MSCS or equivalent, and 2-3 years experience in support and development of IBM 370 operating systems using 370 assembler. Knowledge of VM/370 desirable.

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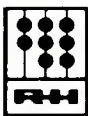
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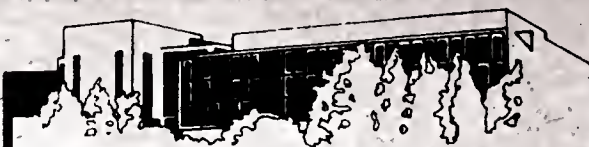
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Jim Hicks, Personnel Director  
H & W Computer Systems, Inc.  
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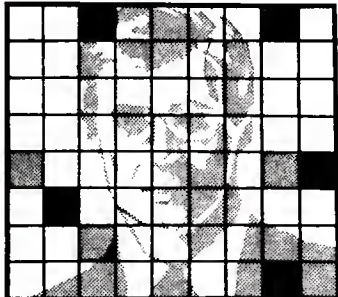
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Three years' experience with DEC VAX or similar computers is necessary, as well as any of the following languages: FORTRAN 77, PASCAL, PL/1, ADA; Macro Assembler. Experience is also required in one or more of the following areas: project leadership with technical, cost, and schedule responsibilities; software concept design studies; advanced software methodologies; computer/computer communications; real-time scientific software development and image analysis. A BS in CS, Math or EE is required. MS or PhD desired.

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- FORTRAN 77, ADA, PASCAL or P/L 1

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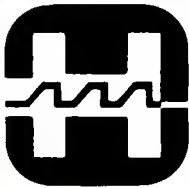
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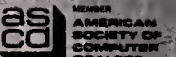
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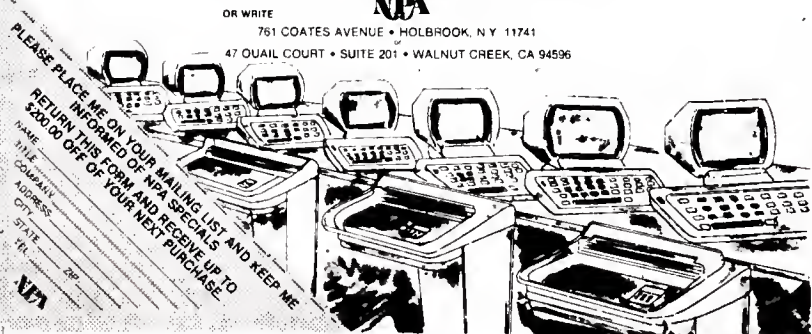


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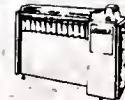
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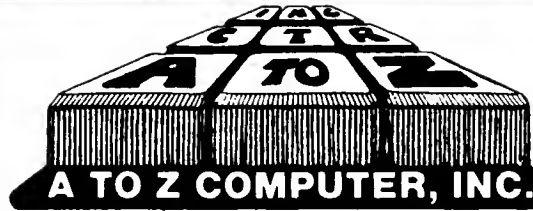
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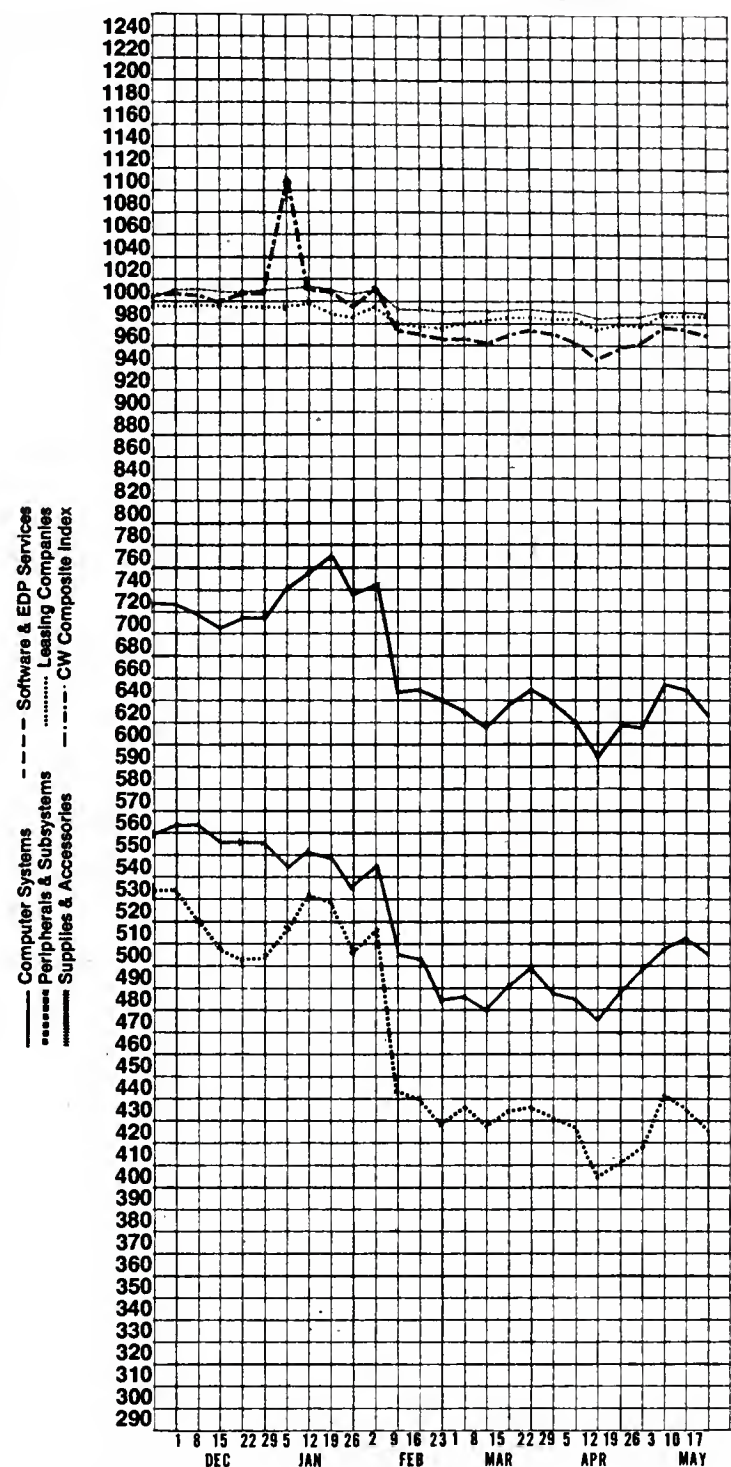
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## Computerworld Stock Trading Index



## Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 16, 1984

All statistics compiled,  
computed and formatted  
by  
TRADE QUOTES, INC.  
Cambridge, Mass. 02139

TRADE QUOTES

| E<br>X<br>C<br>H |                      | 1983-84<br>RANGE<br>(1) | -PRICE-                 |        |       | WEEK<br>NET<br>CHNGE | WEEK<br>PCT<br>CHNGE |
|------------------|----------------------|-------------------------|-------------------------|--------|-------|----------------------|----------------------|
|                  |                      |                         | CLOSE<br>MAY 16<br>1984 |        |       |                      |                      |
|                  |                      |                         |                         |        |       |                      |                      |
| COMPUTER SYSTEMS |                      |                         |                         |        |       |                      |                      |
| O                | ALPHA MICROSYSTEMS   | 11-24                   | 13 1/2                  | 0      | 0.0   |                      |                      |
| O                | ALTOS COMPUTER SYST  | 8-28                    | 11 1/2                  | 0      | 0.0   |                      |                      |
| A                | AMOHL CORP           | 8-30                    | 13 3/8                  | -3/8   | -2.7  |                      |                      |
| O                | APPLE COMPUTER INC   | 18-63                   | 30 1/2                  | -2 5/8 | -7.9  |                      |                      |
| N                | AT&T                 | 15-70                   | 15 7/8                  | -5/8   | -3.7  |                      |                      |
| N                | BURROUGHS CORP       | 28-58                   | 52 5/8                  | -1 1/4 | -0.4  |                      |                      |
| O                | COMPUTER AUTOMATION  | 6-17                    | 6 3/4                   | +1/2   | +8.0  |                      |                      |
| A                | COMPUTER CONSOLES    | 8-26                    | 18 1/2                  | -1/2   | -2.8  |                      |                      |
| N                | CONTROL DATA CORP    | 21-62                   | 31 7/8                  | -1/8   | -0.3  |                      |                      |
| O                | CONVERGENT TECHNOL   | 13-41                   | 18 3/8                  | -1 1/4 | -7.0  |                      |                      |
| N                | CRAY RESEARCH INC    | 20-58                   | 44 1/4                  | -1 7/8 | -4.0  |                      |                      |
| N                | DATA GENERAL CORP    | 10-45                   | 46                      | -1 5/8 | -3.4  |                      |                      |
| N                | DATAPoint CORP       | 11-36                   | 22 7/8                  | -1 7/8 | -7.5  |                      |                      |
| N                | DIGITAL EQUIPMENT    | 62-132                  | 91 1/2                  | -7/8   | -0.9  |                      |                      |
| A                | EECO INC             | 8-16                    | 14                      | -3/8   | -2.6  |                      |                      |
| N                | ELECTRONIC ASSOC.    | 5-15                    | 5 3/4                   | -1/2   | -8.0  |                      |                      |
| N                | FLOATING POINT SYST  | 13-44                   | 15 7/8                  | -1     | -5.9  |                      |                      |
| N                | FOXBORO              | 22-47                   | 33                      | -5/8   | -1.8  |                      |                      |
| O                | GENERAL AUTOMATION   | 2-16                    | 12 1/4                  | -7/8   | -6.6  |                      |                      |
| N                | GOULD INC            | 28-44                   | 27                      | -1 1/4 | -4.4  |                      |                      |
| N                | HARRIS CORP          | 20-51                   | 30 5/8                  | -1     | -3.1  |                      |                      |
| N                | HEWLETT-PACKARD CO   | 22-48                   | 35 3/4                  | +7/8   | +2.5  |                      |                      |
| N                | HONEYWELL INC        | 28-69                   | 34 3/8                  | +5/8   | +1.1  |                      |                      |
| N                | IBM                  | 57-134                  | 112                     | -7/8   | -0.7  |                      |                      |
| O                | IPL SYSTEMS INC      | 4-14                    | 5                       | +1/4   | +5.2  |                      |                      |
| N                | M/A-COM INC          | 13-35                   | 18 5/8                  | -1     | -5.6  |                      |                      |
| N                | MANAGEMENT ASSIST    | 7-28                    | 23 7/8                  | +3/8   | +1.5  |                      |                      |
| N                | MATSUSHITA ELEC(AOR) | 47-88                   | 78 1/8                  | -6 7/8 | -8.0  |                      |                      |
| N                | MODULAR COMPUTER SYS | 6-16                    | 7 3/8                   | -1/4   | -3.2  |                      |                      |
| N                | MOTOROLA DATA SCI    | 9-18                    | 11 5/8                  | -7/8   | -7.0  |                      |                      |
| N                | MOTOROLA INC         | 92-148                  | 117 1/2                 | -2 1/4 | -1.8  |                      |                      |
| N                | NAT'L SEMICONDUCTOR  | 13-60                   | 15                      | -3/4   | -4.7  |                      |                      |
| N                | NBI INC              | 17-51                   | 22 1/4                  | -7/8   | -3.7  |                      |                      |
| N                | NCR                  | 39-136                  | 104 3/8                 | -1 5/8 | -1.5  |                      |                      |
| N                | PERKIN-ELMER         | 17-37                   | 22 1/2                  | -1 7/8 | -7.6  |                      |                      |
| N                | PRIME COMPUTER INC   | 11-30                   | 13 1/8                  | -1 1/2 | -10.2 |                      |                      |
| N                | SPERRY CORP          | 21-50                   | 38 3/8                  | +1/4   | +0.6  |                      |                      |
| N                | TANDEM COMPUTERS INC | 14-40                   | 22                      | -1     | -4.3  |                      |                      |
| N                | TANDY CORP           | 29-65                   | 29 1/4                  | -1 7/8 | -6.0  |                      |                      |
| O                | TELEVIDEO SYSTEMS    | 8-41                    | 8 1/4                   | -1 3/8 | -14.2 |                      |                      |
| O                | TELXON CORP          | 8-16                    | 9 3/4                   | -1 1/4 | -11.3 |                      |                      |
| N                | TEXAS INSTRUMENTS    | 71-176                  | 142 3/4                 | -1 1/4 | -0.8  |                      |                      |
| A                | ULTIMATE CORP        | 8-24                    | 19 1/8                  | +1 1/4 | +6.9  |                      |                      |
| O                | VECTOR GRAPHICS INC  | 1-14                    | 1 1/4                   | -1/4   | -16.6 |                      |                      |
| A                | WAND LABS "B"        | 13-42                   | 26 5/8                  | -1 5/8 | -5.7  |                      |                      |
| A                | WAND LABS "C"        | 11-42                   | 28 3/4                  | -1 3/8 | -4.8  |                      |                      |
| N                | XEROX CORP           | 35-52                   | 39 3/4                  | -1/2   | -1.2  |                      |                      |

## LEASING COMPANIES

|                        |       |        |        |      |
|------------------------|-------|--------|--------|------|
| O BOOTHE FINANCIAL CP  | 11-42 | 39 1/2 | +1 1/2 | +3.9 |
| N COMODIS INC          | 7-42  | 13 1/8 | -1/4   | -1.8 |
| O CONTINENTAL INFO SYS | 3-16  | 8      | -3/8   | -4.4 |
| N OPF INC              | 5-15  | 13 1/2 | -1/4   | -1.8 |
| O PHOENIX AMERICAN INC | 8-17  | 7 3/4  | -1/4   | -3.1 |
| O SELECTEM INC         | 11-21 | 14     | 0      | 0.0  |
| N U.S. LEASING         | 18-47 | 33 1/2 | +1     | +3.0 |

## COMPONENTS

|                        |       |        |        |       |
|------------------------|-------|--------|--------|-------|
| N ADVANCED MICRO DEV   | 13-37 | 33     | -1/4   | -0.7  |
| O ADV'O SEMICONDUCTOR  | 12-38 | 24 3/4 | -1     | -3.8  |
| N ANALOG DEVICES INC   | 14-32 | 20     | -2 1/4 | -10.1 |
| O ANALOGIC CORP        | 14-27 | 15 1/2 | -3/4   | -4.6  |
| N APPLIED MAGNETICS CP | 15-37 | 19 3/4 | -3/8   | -1.8  |
| N TERAONE              | 14-39 | 28     | -3/4   | -2.6  |

| E<br>X<br>C<br>H        |                      | PRICE   |        |        |       |
|-------------------------|----------------------|---------|--------|--------|-------|
|                         |                      | 1983-84 | CLOSE  | WEEK   | WEEK  |
|                         |                      | RANGE   | MAY 16 | NET    | PCT   |
|                         |                      | (1)     | 1984   | CHNGE  | CHNGE |
| SOFTWARE & EDP SERVICES |                      |         |        |        |       |
| O                       | ADVANCED COMP TECH   | 1- 8    | 3      | - 1/4  | -7.6  |
| O                       | ADVANCED SYSTEMS INC | 6- 22   | 15 1/8 | - 5/8  | -3.8  |
| O                       | AGS COMPUTERS INC    | 7- 32   | 18 1/2 | - 3/4  | -3.8  |
| O                       | AMERICAN SOFTWARE    | 13- 31  | 14 1/2 | - 3/8  | -2.5  |
| N                       | ANACOMP INC          | 2- 23   | 3 5/8  | 0      | 0.0   |
| O                       | ANALYSTS INTL CORP   | 5- 20   | 5 3/4  | - 1/4  | -4.1  |
| A                       | APPLIED DATA RES.    | 8- 37   | 20     | - 1/2  | -2.4  |
| O                       | ASK COMPUTER SYSTEMS | 6- 21   | 15 1/2 | - 1/2  | -3.1  |
| S                       | ASTRAEDYN COMP IND   | 1- 7    | 1 3/4  | 0      | 0.0   |
| N                       | AUTOMATIC DATA PROC  | 21- 44  | 33 3/8 | + 1/8  | +0.3  |
| O                       | CGA COMPUTER ASSOC   | 5- 17   | 10 1/2 | + 1/8  | +1.2  |
| O                       | COMPUTER ASSOC INT'L | 6- 35   | 20     | -1     | -4.7  |
| O                       | COMPUTER HORIZONS    | 8- 20   | 11 1/2 | - 1/4  | -2.1  |
| O                       | COMPUTER NETWORK     | 4- 10   | 5 5/8  | - 1/4  | -4.2  |
| N                       | COMPUTER SCIENCES    | 11- 23  | 14 1/4 | - 3/8  | -2.5  |
| O                       | COMPUTER TASK GROUP  | 8- 22   | 14     | 0      | 0.0   |
| O                       | COMPUTER USAGE       | 2- 22   | 7 1/4  | + 3/4  | +11.5 |
| O                       | COMPUTONE SYSTEMS    | 5- 38   | 5 1/2  | + 1/2  | +10.0 |
| O                       | COMSERV CORP         | 2- 20   | 3 5/8  | - 1/8  | -3.3  |
| O                       | COMSHARE             | 7- 14   | 7 1/2  | - 1/2  | -6.2  |
|                         |                      |         |        |        |       |
| N                       | CULLINET SOFTWARE    | 12- 50  | 32     | -1     | -3.0  |
| O                       | CYCARC SYSTEMS INC   | 9- 27   | 17 1/4 | - 1/4  | -1.4  |
| N                       | ELECTRONIC DATA SYST | 10- 42  | 35 1/2 | +5 1/4 | +17.3 |
| O                       | HOAN SYSTEM INC      | 14- 27  | 17     | -2     | -10.5 |
| N                       | GENERAL ELECTRIC CO  | 45- 59  | 54 1/4 | - 5/8  | -1.1  |
| N                       | GTE CORP             | 38- 48  | 37 1/2 | - 5/8  | -1.6  |
| N                       | INFORMATICS INC      | 10- 34  | 21 1/2 | - 7/8  | -3.9  |
| O                       | INFOTRON SYSTEMS COR | 25- 43  | 29 1/4 | -3     | -9.3  |
| O                       | KEANE ASSOCIATES     | 4- 15   | 9      | 0      | 0.0   |
| A                       | LOGICON              | 8- 31   | 20 3/4 | -2 3/8 | -10.2 |
| O                       | MCI COMMUNICATIONS   | 6- 34   | 8 1/8  | + 1/8  | +1.3  |
| O                       | MGT SCI AMER INC     | 8- 33   | 18     | -1 5/8 | -8.2  |
| O                       | MATHEMATICAL APP GRP | 7- 22   | 7 1/4  | - 1/4  | -3.3  |
| O                       | MICOM SYSTEMS INC    | 25- 50  | 38 1/2 | -1 1/4 | -3.1  |
| O                       | MONCHIK-NEBER CP     | 6- 22   | 7 5/8  | - 5/8  | -7.5  |
| O                       | NATIONAL DATA CORP   | 5- 26   | 17 3/8 | - 3/8  | -2.1  |
| O                       | ON-LINE SOFTWARE INT | 8- 27   | 11     | - 1/2  | -4.3  |
| O                       | PANSOPHIC SYSTEMS    | 8- 30   | 14 1/2 | - 5/8  | -4.1  |
| N                       | PLANNING RESEARCH    | 6- 21   | 14 5/8 | + 3/4  | +5.4  |
| O                       | POLICY MGMT SYSTS CP | 15- 35  | 25 1/2 | -3 1/2 | -12.0 |
|                         |                      |         |        |        |       |
| O                       | PROGRAMMING & SYS    | 1- 8    | 4 3/8  | - 1/8  | -2.7  |
| O                       | REYNOLDS & REYNOLD   | 17- 53  | 33 1/2 | - 1/4  | -0.7  |
| O                       | SEI CORP             | 11- 34  | 14 1/4 | - 1/2  | -3.3  |
| O                       | SHARED MEDICAL SYST  | 13- 43  | 29 1/4 | 0      | 0.0   |
| O                       | SCIENTIFIC COMPUTERS | 8- 14   | 9 1/4  | - 1/4  | -2.6  |
| O                       | SOFTWARE AD          | 5- 17   | 12 1/2 | 0      | 0.0   |
| A                       | URS CORP             | 5- 18   | 11 1/4 | - 1/8  | -1.0  |
| N                       | WYLY CORP            | 7- 17   | 9 7/8  | - 1/4  | -2.4  |

## PERIPHERALS &amp; SUBSYSTEMS

|                        |      |        |        |       |
|------------------------|------|--------|--------|-------|
| P AM INTERNATIONAL     | 2-7  | 3 5/8  | +5/8   | +20.8 |
| A ANDERSON JACOBSON    | 7-28 | 9 1/4  | -1/4   | -2.6  |
| O AUTO-TROL TECHNOLOGY | 8-29 | 17     | -1/4   | -1.4  |
| O BANCORP INC          | 7-33 | 8      | -1/4   | -3.0  |
| A BEEHIVE INT'L        | 3-15 | 3 1/8  | -1/8   | -3.8  |
| N BOLT, BERANEK & NEW  | 5-30 | 21 1/8 | -3/4   | -3.4  |
| O CAMBEX CORP          | 1-4  | 1 1/2  | -1/8   | -7.6  |
| N CENTRONICS DATA COMP | 6-28 | 10 7/8 | -1/2   | -4.3  |
| A CETEC CORP           | 4-12 | 9 3/8  | +1/8   | +1.5  |
| O COGNITRONICS         | 2-20 | 7 1/8  | -1 1/8 | -13.6 |

| E<br>X<br>C<br>H |                        | 1983-84<br>RANGE<br>(1) | PRICE                   |    |     | WEEK<br>CHNGE | WEEK<br>PCT<br>CHNGE |
|------------------|------------------------|-------------------------|-------------------------|----|-----|---------------|----------------------|
|                  |                        |                         | CLOSE<br>MAY 16<br>1984 |    |     |               |                      |
| O                | COMPUTER DEVICES INC   | 0- 21                   | 3/4                     | +  |     | +9.0          |                      |
| O                | COMPUTER TRANSCIVER    | 3- 12                   | 2 3/4                   | -  | 1/8 | -4.3          |                      |
| N                | COMPUTERVISION CORP    | 15-33                   | 37 1/8                  | +1 |     | +2.7          |                      |
| N                | CONRAC CORP            | 14-38                   | 14 5/8                  | -  | 1/8 | -0.8          |                      |
| A                | DATAPRODUCTS CORP      | 18-41                   | 20 7/8                  | -2 | 7/8 | -12.1         |                      |
| A                | DATARAM CORP           | 5- 12                   | 9 1/8                   | 0  |     | 0.0           |                      |
| O                | DATA SWITCH CORP       | 13-41                   | 20 3/4                  | +1 | +4  | +1.2          |                      |
| O                | DATUM INC              | 2- 17                   | 6 3/8                   | 0  |     | 0.0           |                      |
| O                | DECISION DATA COMPUT   | 3- 16                   | 10                      | -  | 1/2 | -4.7          |                      |
| O                | DECUTEL-OLIVETTI       | 7- 39                   | 8 3/8                   | +1 | +8  | +1.5          |                      |
| N                | ELECTRONIC M & M       | 5- 11                   | 6 5/8                   | -  | 3/8 | -5.3          |                      |
| O                | ENODATA, INC           | 9- 16                   | 9 5/8                   | -  | 3/8 | -3.7          |                      |
| O                | EVANS & SUTHERLAND     | 17-50                   | 18 3/4                  | -1 | 1/2 | -7.4          |                      |
| O                | GANDOLF TECHNOLOGIES   | 9- 22                   | 10 1/2                  | -  | 1/4 | -2.3          |                      |
| N                | GEN'L DATA COMM IND    | 6- 33                   | 31 1/8                  | -  | 1/8 | -0.3          |                      |
| O                | GREAT SOUTHWEST IND    | 1- 6                    | 1                       | 0  |     | 0.0           |                      |
| N                | HAZELTINE CORP         | 7- 31                   | 27 1/2                  | -  | 1/2 | -1.7          |                      |
| O                | ICOT CORP              | 3- 10                   | 3 1/4                   | -  | 3/8 | -10.3         |                      |
| O                | INFORMATION INTL INC   | 10-22                   | 11 3/4                  | 0  |     | 0.0           |                      |
| O                | INFORMATION SCIENCE    | 8- 17                   | 8 1/2                   | +1 | 1/2 | +6.2          |                      |
| O                | INTEL CORP             | 11-45                   | 33 3/4                  | -  | 1/2 | -1.4          |                      |
| O                | IPL SYSTEMS INC        | 4- 14                   | 5                       | +1 | +4  | +5.2          |                      |
| A                | LUNDY ELECTRONICS      | 7- 19                   | 10 5/8                  | 0  |     | 0.0           |                      |
| O                | MEGADATA CORP          | 8- 15                   | 9                       | -  | 1/2 | -5.2          |                      |
| A                | MSI DATA CORP          | 15-37                   | 15 1/4                  | -1 |     | -6.1          |                      |
| N                | NASHUA CORP            | 9- 29                   | 27                      | +1 | +8  | +0.4          |                      |
| O                | NETWORK SYSTEMS CORP   | 8- 34                   | 21 7/8                  | 0  |     | 0.0           |                      |
| N                | NO AMERICAN PHILIPS    | 17-40                   | 33 3/4                  | -1 | 1/4 | -3.5          |                      |
| N                | NORTHERN TELECOM LTD   | 22-49                   | 33                      | -  | 1/4 | -0.7          |                      |
| O                | OMEX                   | 1- 5                    | 1/4                     | 0  |     | 0.0           |                      |
| N                | PARADYNE CORP          | 13-30                   | 16 7/8                  | 0  |     | 0.0           |                      |
| A                | PENRIL CORP            | 7- 14                   | 12 1/4                  | +1 | +2  | +4.2          |                      |
| O                | PHOENIX AMERICAN INC   | 7- 17                   | 7 3/4                   | -  | 1/4 | -3.1          |                      |
| N                | PLESSEY CO (AOR)       | 26-41                   | 29 1/4                  | -1 | 3/4 | -5.6          |                      |
| O                | PRINTRONIX INC         | 20- 34                  | 22                      | -1 | 1/4 | -5.3          |                      |
| O                | RAMTEK CORP            | 9- 26                   | 9                       | -1 | 3/4 | -16.2         |                      |
| N                | RAYTHEON CO            | 36-58                   | 38 1/2                  | -  | 1/4 | -0.6          |                      |
| N                | RECOGNITION EQUIP      | 4- 17                   | 13 3/8                  | -  | 1/4 | -1.8          |                      |
| N                | ROLM CORP              | 30- 80                  | 35                      | +1 | +2  | +1.4          |                      |
| N                | SANDERS ASSOCIATES     | 36-120                  | 38 1/4                  | -3 | 3/4 | -8.9          |                      |
| O                | SCAN DATA              | 1- 3                    | 3/8                     | 0  |     | 0.0           |                      |
| O                | SCAN-TRON CORP         | 12- 19                  | 13 7/8                  | +7 | +8  | +6.7          |                      |
| N                | SCIENTIFIC ATLANTA     | 8- 23                   | 10 1/8                  | -  | 1/2 | -4.7          |                      |
| N                | STORAGE TECHNOLOGY     | 9- 33                   | 9 3/4                   | -5 | -8  | -6.0          |                      |
| O                | SYKES DATATRONICS      | 3- 27                   | 3 1/4                   | -  | 1/4 | -7.1          |                      |
| O                | SYSTEMS & COMP TECH    | 20- 39                  | 25 1/4                  | -1 | -4  | -0.9          |                      |
| A                | T BAR INC              | 7- 17                   | 9 3/4                   | -  | 3/8 | -3.7          |                      |
| A                | TAB PRODUCTS CO        | 5- 20                   | 16 7/8                  | -1 | 5/8 | -8.7          |                      |
| O                | TANODIN CORP           | 10- 35                  | 9 5/8                   | -  | 1/2 | -4.8          |                      |
| A                | TEC INC                | 6- 12                   | 11 1/4                  | +1 | +8  | +1.1          |                      |
| N                | TEKTRONIX INC          | 34- 77                  | 59 3/4                  | -1 | 1/4 | -2.0          |                      |
| N                | TELEARK                | 5- 32                   | 23                      | -  | 1/8 | -0.8          |                      |
| N                | TESOTA DATA SYSTEMS CP | 3- 17                   | 4 7/8                   | -  | 3/8 | -7.5          |                      |
| N                | TIMEPLEX INC           | 7- 25                   | 15 3/4                  | -  | 7/8 | -5.2          |                      |
| O                | VISUAL TECHNOLOGY      | 9- 26                   | 12 5/8                  | -  | 1/8 | -0.9          |                      |



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